East Bench Watershed Assessment Report

Dillon Field Office

December, 2008

McHessor Creek, July, 2008

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Maps

Introduction

This document is a land health assessment of the public lands administered by the Bureau of Land Management (BLM) in the East Bench Watershed (EBW) (**Map 1)**. The assessment area includes public land in the Beaverhead and Ruby River watersheds. For various reasons some public land in the North Fork AMP and Belmont South Isolated grazing allotments had not been assessed prior to 2008. These two allotments were included in the EBW assessment to ensure compliance with the Congressional mandate that all grazing permits and leases are assessed for the five standards of rangeland health by fall 2009 (43CFR 4180).

This is the first in a series of documents: the Watershed Assessment Report, the Authorized Officer's Determination of Standards, and the appropriate National Environmental Policy Act (NEPA) documentation and subsequent Decision(s).

The watershed assessment reports the condition and/or function of public land resources within the EBW to the Authorized Officer. The Authorized Officer considers the report to determine if the five standards of rangeland health are currently being met, and then signs a Determination of Standards documenting where land health standards are, or are not, in compliance.

The Assessment Report also contains initial recommendations developed by the interdisciplinary team (IDT) during field assessments. The recommendations in the report focus primarily on livestock management, noxious weed management, and timber and fuels management. Other public land uses and activities are also addressed including: recreation and wilderness, wildlife and fisheries habitat, mining, public access, travel management and road maintenance. Impacts from all uses and programs were assessed and documented as part of the process.

The assessed land health conditions and/or functionality are the basis for the IDT's management recommendations in this report and the Determination of Standards. As required by NEPA regulations, an Environmental Assessment (EA) will be completed addressing all resource concerns identified within the 14 grazing allotments and on un-allotted or un-leased public lands within the EBW.

Alternative management will be analyzed wherever it is determined that:

- specific grazing allotments are not meeting the Standards
- allotments are meeting the Standards but have site specific concerns
- there are unhealthy forest conditions in the watershed
- fuels conditions are outside the natural range of variability
- other documented resources concerns

Also, if existing grazing management practices or levels of grazing use on public lands are determined to be significant factors in failing to achieve one or more of the five standards, the BLM is required by regulation (43 CFR 4180.1) to make grazing management adjustments.

Implementation of new plans will begin in 2009, but it may take several years to fully implement revised grazing management plans, range improvement projects, forest treatments and/or fuels projects.

The new plans will be developed in consultation and coordination with the affected lessees, the State having lands or managing resources within the area and other interested parties.

As with all similar BLM decisions, affected parties will have an opportunity to protest and/or appeal these decisions.

Background

Within the EBW there are approximately 23,000 acres of public land administered by the BLM. Fourteen grazing allotments (units) contain 17,479 acres of BLM land, of which about 6,000 are within the Ruby Mountain Wilderness Study Area (WSA). An additional 5,374 acres of public land are either un-allotted or un-leased. All but 40 acres of un-allotted BLM acres are within the WSA. The entire EBW covers approximately 211,000 acres of public, private and state land. This report addresses only land health conditions on public land administered by the BLM.

The EBW boundary follows grazing allotment borders and includes some allotments that are only partially within the watershed. Technically, the EBW is not a distinct watershed. Watersheds are defined, and designated on maps, by natural topographical boundaries (ridgelines/drainages). Grazing allotments boundaries have been determined by previous BLM decisions and land ownership. These artificial boundaries may not follow topographical features. Therefore, some of the grazing allotments in the assessment area fall within one or more watershed or hydrologic unit.

The EBW is located in Madison County, Montana. The watershed drains the western and southern slopes of the Ruby mountain range and lies within Townships 5-8 south and Ranges 5-7 West, Montana Principal Meridian.

Topography varies from rolling sagebrush and grass covered bench lands to high alpine slopes. Elevations range from approximately 5,400 to 9,200 feet above sea level. The headwaters of several stream systems are found high on the western and southern slopes of the Ruby Mountains. Stone Creek, Trout Creek, Spring Creek and McHessor Creek and their tributaries bisect the landscape through deep drainages and ravines eventually flowing into the Beaverhead River.

Vegetation in the watershed reflects the diversity of ecological conditions across the landscape. The dominant plant communities and habitat types change according to soils, precipitation, elevation, slope and aspect (directional slope alignment). A wide variety of vegetation is found from wetland and riparian species dependent on water and moist soils to sagebrush and grass dominated plant communities that thrive on dryer upland sites. Forested habitats cover the higher elevations. The watershed's diverse landscape and vegetation provides habitat and structural niches for a variety and abundance of wildlife.

Average annual precipitation within the watershed varies from about 12 inches on the lower benches to more than 24 inches in the higher elevations of the Ruby Mountains.

The Dillon Field Office completed a new Resource Management Plan (RMP) in February of 2006. This document will provide program guidance in the Dillon Field Office for the next 20 years. The RMP replaces The Dillon Resource Area Management Framework Plan (1979) and the Mountain Foothills Environmental Impact Statement (EIS) - Rangeland Management Program Summary (1981).

It is the BLM's intent is to implement watershed management cooperatively. By working on a watershed basis, a broader landscape is considered and more consistent management can be applied. Any changes in livestock management will be implemented through grazing decisions that address allotments or groups of allotments with a common lessee. Forest health and fuels management treatments or projects, noxious weed management, and any other management projects or changes will be implemented through appropriate program specific Decisions.

Cultural History

In conjunction with the Mountain Foothills Grazing EIS in the late 1970s, a Class II cultural resources inventory was conducted for a 10% sample of lands within the Dillon Resource Area. Results of the sample inventory located a mixture of prehistoric and historic sites throughout the watershed (Earl 1980).

Prehistorically, the EBW was occupied continuously from approximately 10,000 years ago until historic contact during the fur trade of the 1830s. Prehistoric sites within the watershed include primarily small habitation or procurement sites (DFOCRD 2008).

Historically, portions of the EBW were originally explored by Lewis and Clark in the summer of 1805 eventually leading to further explorations during the fur trade in the 1830s. Soon after the gold boom of Virginia City in the late 1860s, small time ranching began to take hold along the McHessor Bench. Ranching consisted mainly of sheep and horses in the early days, eventually expanding more to cattle in the early 20th century. Hay, wheat and barley production were also important to the East Bench region during its early history (Madison County History Association 1976).

Ruby Mountains Wilderness Study Area

The Ruby Mountains Wilderness Study Area (WSA) contains approximately 26,611 acres. Only 11,326 acres of the WSA is within the EBW. A total of 15,615 acres of the wilderness study area are recommended suitable for designation as part of the National Wilderness Preservation System. The wilderness qualities of naturalness, opportunities for solitude and primitive and unconfined types of recreation were identified as important attributes of this WSA. Other special features identified in the Montana Statewide Wilderness Report (1991) included scenic quality and variety, including steep canyons, rock walls, caves, etc.

The 2006 Dillon Field Office RMP also identified the Ruby Mountains WSA as a Special Recreation Management Area to be managed for primitive and semi-primitive non-motorized recreation opportunities even if it is released by Congress from further consideration as

wilderness. It is also identified as one of three priority areas in the Field Office for potential non-motorized trail construction to improve opportunities for horseback riding and hiking.

Travel Management

The BLM Dillon Field Office designated roads open to motorized use in the 2006 RMP, but said at that time that we would, "Update and maintain the road and trail database to correct mapping errors and refine decisions." The watershed assessment process provides an appropriate mechanism for refining these decisions due to the area-specific focus on multiple resources within each watershed.

Authorized Uses

Forest Products

Forest resources in the watershed have been utilized since the beginning of European settlement during the 1860's. Evidence in the form of old stumps can be found across all ownerships through forested habitats in the assessment area.

Recent forest management activities (timber harvests) on BLM administered lands occurred in the 1990s in the Spring Creek and Stone Creek areas in the southern Ruby Mountains. Approximately 120 acres of forested lands have been harvested in the Spring Creek area, and approximately 20 acres of forested lands have been harvested in the Stone Creek area. In the Stone Creek area, timber harvest has primarily been associated with construction and expansion of the Treasure Mine. A small amount of timber material in this area is being removed and utilized for rehabilitation work associated with the mine.

Mining

The Mining and Minerals Policy Act of 1970, the Federal Land Policy and Management Act of 1976 (FLPMA), and the Natural Materials and Minerals Policy, Research and Development Act of 1980 direct that the Public lands be managed in a manner that recognizes the Nation's needs for domestic sources of mineral production. Under the 1872 Mining Law, claimants have a statutory right to develop their mineral deposits consistent with applicable environmental laws.

The EBW contains numerous areas of high mineral potential and known mineral deposits. Many of these deposits are industrial minerals such as talc and chlorite. There are two large open pit talc mines in the watershed within close proximity, the Barretts Minerals Inc. Treasure Mine and the Luzenac Beaverhead mine.

The Treasure mine has disturbed a total of approximately 375 acres in the Stone Creek drainage. The open pit accounts for just over 120 acres, most of which is patented land. The majority of the east waste dump (approximately 75 acres) has been almost entirely reclaimed. The remaining disturbance of 180 acres is active waste dump, facilities, haul roads, stock piles and areas that are in various stages of reclamation.

The Beaverhead Mine is/was a small to medium size open pit mine that is substantially smaller than the nearby Treasure Mine. The deposit was mined underground for a number of years with the portal being at the bottom of the open pit. The operation has been shut down for almost 10 years and the site is almost entirely reclaimed.

The watershed area has seen numerous exploration projects over the year, many of them for talc and other similar minerals. There are currently two active exploration Notices (43 CFR 3809) in the watershed where drilling is taking place for talc.
The EBW assessment area does have potential for salable material such as decorative stone, building stone, gravel and other commodities.

BLM has no community pits in the watershed. Community pits are sites that are set up specifically for the sale of mineral material. Neither are there any current exclusive sales of mineral materials in the watershed.

The watershed area is considered to have low to moderate potential for oil and gas. No exploration is known to have taken place in the watershed in recent years.

Livestock Grazing

The assessment area includes 14 grazing allotments covering 17,479 acres of public land (**Map 2**). Eleven different business entities or individuals hold grazing authorizations on these allotments. The EB assessment area also includes 5,334 acres of un-allotted land in the Ruby Mountain Wilderness Study Area and 40 acres of un-leased public land along the lower Stone Creek Road.

BLM administered lands provide a large proportion of the late spring, summer and fall forage base in the watershed. There are 2,192 animal-unit months (AUMs) of allocated livestock forage on public lands within the allotments. The stocking rate on BLM lands within the watershed ranges from 2 acres/AUM to 161 acres/AUM. This extreme variance is influenced by soils, vegetative type, topography (aspect, elevation, and slope), distance from water and local weather. Cattle are designated as the "kind" of livestock authorized to graze on 10 allotments, bison (indigenous species) are authorized on 2 allotments and cattle and sheep on 2 allotments.

Grazing allotments and rangeland areas used for livestock grazing are assigned to an allotment category during resource management planning. All livestock grazing allotments in the Dillon Field Office have been categorized as *Improve (I), Maintain (M)* or *Custodial (C)* based on resource values, opportunities for improvement and the BLM's level of management. Allotment categorization is also used to establish priorities for distributing available funds and personnel during plan implementation to achieve cost-effective improvement of rangeland resources. Improve *(I)* category allotments are managed more intensively and are monitored more frequently. Category *(M)* allotments are usually at a desired ecological condition and are managed to maintain or improve that condition. Custodial *(C)* category allotments are generally isolated parcels where public land is a small part of the total grazing area and/or have few resource concerns. They are managed in conjunction with the lessee's normal livestock operation and monitored less frequently.

Three allotments in the EBW, McHessor Creek, Middle Fork and Stone Creek, are categorized as *I* allotments, one, the North Fork AMP is *M,* and the other 10 are *C* allotments.

Table 1: Grazing Allotments Summary

Allotment number category	Grazing Authorization Number	Season of Use	Livestock Number and Kind	Grazing System	[1]Stocking Rate on BLM	BLM Active AUMs	BLM Acres	Other Ownerships	Total Acres
Belmont South Isolated #20320 Custodial	2500150	03/01-02/28	26 Indigenous	Seasonal use with private	8:1	38	255	5620	5940
Big Sheep #10513 Custodial	2505765	05/01-11/19	28 Sheep 5 Cattle	Seasonal use with private	7:1	73	499	0	499
Cater Creek #10534 Custodial	2501490	05/15-11/14	3 Cattle	Seasonal use with private	12:1	23	282	0	282
Garden Creek Isolated #30601 Custodial	2505730	05/15-11/01	12 Cattle	Seasonal use with private	18:1	66	1176	1876	3052
Hoffman Creek Isolated #10511 Custodial	2505764	05/01-11/25	13 Cattle	Seasonal use with private	8:1	35	285	0	285
Lark Isolated # 30678 Custodial	2505770	05/01-11/25	13Cattle	Seasonal with private	12:1	89	1025	4	1029
McHessor Creek #10530 Improve	2055783	07/01-10/15	91 Cattle	Seasonal use with private	27:1	159	4364	2710	7074
McHessor Creek Isolated #10680 Custodial	2505783	06/01-11/15	1 Cattle	Seasonal use with private	161:1	6	967	3195	4162
Middle Fork #20525 Improve	2505617 & 2505030	06/20-10/15	225 Cattle & 112 Cattle	RR	2:1	862	1818	1520	3338
North Fork AMP #10482 Maintain	2505733	03/01-04/30	371 Cattle	Seasonal use with private	8:1	222	1736	5587	7323
		12/01-02/28	371 Cattle						

Allotment number category	Grazing Authorization Number	Season of Use	Livestock Number and Kind	Grazing System	[1]Stocking Rate on BLM	BLM Active AUMs	BLM Acres	Other Ownerships	Total Acres
Nyhart #20470 Custodial	2505765	05/01-11/30	30 Sheep 5 Cattle	Seasonal use with private	9:1	85	782	0	782
Spring Canyon #10527 Custodial	2500129	06/15-09/01	15 Cattle	Seasonal use with private	13:1	38	515	0	515
Stone Creek #10498 Improve	2505749	07/15-09/30	600 Cattle	RR	5:1	776	3699	4681	8380
Stone Creek Isolated #10674 Custodial	2505749	10/01-10/31	6 Cattle	Seasonal use with private	7:1	6	39	0	9

[1]*Acres per AUM ratio*
RR- Rest Rotation

Assessment Process

This assessment was done in accordance with the BLM regulations regarding Rangeland Health Standards.

- BLM Manual H-4180-1, Rangeland Health Standards Handbook and Guidance for Conducting Watershed-Based Land Health Assessments.
- Code of Federal Regulation 43 CFR, Subpart 4180
- Record of Decision (ROD) - Standards for Rangeland Health and Guidelines for Livestock Grazing Management (S&Gs) for Montana, North Dakota and South Dakota.
- National Fire Plan

Rangeland Health Standards are described in detail in the Record of Decision (ROD) Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Montana, North Dakota, and South Dakota-Western Montana Standards. The preamble of the Western Montana Standards states: "The purpose of the S&Gs (Standards and Guidelines) are to facilitate the achievement and maintenance of healthy, properly functioning ecosystems within the historic and natural range of variability for long-term sustainable use." Standards are statements of physical and biological condition or degree of function required for healthy sustainable lands. Achieving or making significant progress towards these functions and conditions is required of all uses of public lands as stated in 43 CFR 4180.1.

This assessment will report condition and/or function for the following five standards:

- Standard #1 Upland Health
- Standard #2 Riparian /Wetland Health
- Standard #3 Water Quality
- Standard #4 Air Quality

- Standard #5 Biodiversity

In addition, this assessment will report condition and/or function for forest health and fuels. Forest health can affect each of the five standards, but in this assessment will be reflected under Standard #5 Biodiversity, along with other factors that affect biodiversity (including Special Status Species). These assessments are made on an allotment scale, with the exception of Air Quality, which is made at the watershed scale.

Condition/function declarations regarding the Standards are made as:

- Proper Functioning Condition (PFC)
- Functioning At Risk (FAR); which is assigned a trend of up, down, static, or not apparent
- Nonfunctioning (NF)

Land Health Standards are met when conditions across an allotment are at PFC or FAR with an upward trend. This is dependent on scope and scale and determined by the Authorized Officer. The Authorized Officer's Determination will be prepared and sent out during the spring, 2009.

Available trend monitoring data, existing inventories, historical photographs and standardized methodology are used by an interdisciplinary team (IDT) to assess condition and function. All this information including technical references, BLM policy and procedure handbooks, and monitoring guidelines and methodologies are available for review at the Dillon Field Office. Technical references and BLM procedural handbooks are also available on the BLM library website; http://web.nc.blm.gov/blmlibrary.

Format

The Upland, Riparian, Air Quality, Water Quality, and Biodiversity Standards will follow the following format:

1) Affected Environment - This section briefly describes the area and resources that were assessed.

2) Analysis and Recommendations - This section outlines the procedures the IDT used to determine conformance with the various standards and lists the findings and includes recommendations suggested by the IDT during the field assessments.

Uplands

Western Montana Standard #1: *"Uplands are in Proper Functioning Condition."*

Affected Environment

Sagebrush steppe and grassland areas are considered uplands for purposes of this report. According to satellite imagery, 47% of the watershed is classified as sagebrush-steppe and grassland uplands (42% sagebrush-steppe, 5% grasslands).

The variety, distribution and ecological seral (successional) stage of the plant communities in the EBW area are a function of climate, geology, and soil combined with:

- historic uses (e.g. grazing, mining, and timber harvest)
- short term weather patterns
- disturbance regimes (drought, fire, floods and herbivory)

Vegetation

The upland plant composition in the upper elevations of the EBW is changing as the result of ecological succession. The natural progression from early seral stage plant communities towards a climax plant community (the final vegetation community and highest ecological development) is inevitable without disturbance. The spread of primarily Douglas-fir *(Pseudotsuga menziesii)* and Rocky Mountain juniper *(Juniperus scopulorum)* can be attributed, in part, to the reduced frequency of wildfire which has changed the dominant plant species and habitat types on some of the public lands in the Ruby Mountains.

The lower elevations on the terraces and benches west and south of the Rubys are dominated by several species of sagebrush: mountain big sagebrush *(Artemisia tridentata spp. vasayana),* basin big sagebrush *(Artemisia tridentata tridentata),* and black sagebrush *(Artemisia arbuscula var. nova).* Cool season range grasses grow in the understory of these sagebrush/grassland habitats. Some of the prominent herbaceous species include bluebunch wheatgrass *(Pseudoroegneria spicatum),* western wheatgrass *(Pascopyrum smithii),* Sandberg bluegrass *(Poa secunda),* needle-and-thread grass *(Hesperostipa comata),* Prairie junegrass *(Koeleria macrantha)* and Idaho fescue *(Festuca idahoensis).*

Rubber rabbitbrush *(Ericameria nauseosa),* green rabbitbrush *(Chrysothamnus viscidiflorus),* fringed sagewort *(Artemisia frigida)* and broom snakeweed *(Gutierrezia sarothrae)* are common native shrubs found on ecological sites in the watershed. If any of these shrubs have greater than 5% canopy cover on a site, it usually indicates that site has been subject to some kind of past disturbance.

Scattered patches of curleaf mountain mahogany *(Cercocarpus ledifolius)* are found on rocky slopes and ridges throughout the watershed. It is a good source of winter forage for deer and year-round cover for deer and antelope.

Winterfat *(Krascheninnikovia lanata)* and gray horsebrush *(Tetradymia canescens)* are found in limey soils along with Indian ricegrass *(Achnatherum hymenoides),* western wheatgrass and needle-and-thread grass.

Current vegetative cover was calculated using satellite imagery (SIMPPLLE data). Table 2 summarizes the different cover types on all land ownerships within the EBW.

Table 2: General Cover Types Summary

Cover Type	BLM Acreage	% of BLM Acreage in Cover type	Total Watershed Acreage	% of Total Watershed in Cover Type
Forested	11,338	49%	18,975	9%
Grasslands	1,235	5%	87,010	38%
Sagebrush/Mountain Shrubs	9,832	42%	66,934	32%
Riparian/Mesic Shrubs	84	< 1%	4,467	2%
Mountain Mahogany	127	< 1%	501	< 1%
Aspen	10	< 1%	564	< 1%
Other	509	2%	38,487	18%
Totals	23,137	100	210,939	100

Upland Vegetation Treatments

The Middle Fork Spray herbicide treatment (project #474891) in 1971 covered approximately 1000 acres. The project, primary in T 7 S R 6 W section 23, north of the Middle Fork of Stone Creek, was done to reduce upland sagebrush and increase herbaceous composition and diversity.

Noxious Weeds

Noxious weeds found within the EBW that are of primary concern include houndstongue *(Cynoglossum officinale)* and spotted knapweed *(Centaurea stoebe).*

Houndstongue is scattered throughout the watershed, primarily along riparian bottoms, roads and trails. Houndstongue is toxic to animals due to high levels of alkaloids contained in the plant. Due to the difficulty in treating infestations found in riparian areas and because of its seeds ability to cling to hair and clothing, the potential is high for it to be spread to disturbed areas within the watershed. Houndstongue is an opportunistic invader (moves into disturbed areas), not an aggressive invader like spotted knapweed.

Spotted knapweed is not common in the EBW. It is widely scattered and found along a few roads and/or disturbed areas. However, because it is one of the more aggressive noxious weeds in Montana, and currently is found in relatively low infestation levels in the watershed, spotted knapweed is high priority for preventative treatment.

Cheatgrass, a winter annual invasive species, is also a concern within the EBW. It is currently found in small patches throughout the watershed in disturbed areas, past wildfire areas, riparian bottoms and adjacent south facing slopes.

Other noxious or invasive weeds present in widely scattered infestations include black henbane *(Hyoscyamus nigar)* and Canada thistle *(Cirsium arvense).* Black henbane is found primarily

along roads within the area. Canada thistle is common in riparian bottoms that have had disturbance.

Since 1989, BLM has been involved in cooperative weed management efforts with Madison County and some private landowners. Throughout this period, the goal has been to prevent new noxious weed infestations and control or eradicate existing infestations in the watershed using Integrated Pest Management.

Table 3 shows the acreage of herbicide treatments in the EBW during the past four years.

Table 3: Weed Treatments

Year	Acres Treated	Acres Inventoried
2005	15	700
2006	10	400
2007	12	600
2008	10	500

Soils

The Ruby Mountains are the result of complex faulting and uplift. The geological activity that formed the foothills and basins in the EBW area is typical of the northern Rockies. The basins, or valleys, between mountain ranges were progressively filled with sediment carried into them by streams draining the adjacent mountain ranges. The major streams were greatly overloaded with sediment and could not carry material away as fast as it was provided. In addition volcanic material, such as ash and breccia, was often added to the already excessive supply of sediment. The resulting basin fill material is a complex mixture from erosion and Volcaniclastic material.

According to the Madison County Soil survey, the EBW assessment area is comprised of 5 main soil units or groups. Three soils groups are found on the semi-arid upland portion of the watershed in lower McHessor Creek, Trout Creek, Spring Creek and Stone Creek drainages. The topography in these areas varies from level to very steep and the soils are well drained or even excessively drained. They formed in alluvial and erosive material and in material derived from igneous (molten) and metamorphic (altered composition, crystalline) rock.

Another soil complex is found on sub-humid uplands in the EBW in upper Stone Creek, Middle Fork and Sage Creek drainages. This soil is shallow to deep, well drained and is found on nearly level to steep terrain. They formed in alluvium, colluvium (moved by slide or local wash), glacial till (unsorted material), erosive material and in materials from igneous and metamorphic rock. They primarily support rangeland vegetation communities.

The high mountain soils in the watershed are found in gently sloping to very steep terrain in the upper McHessor Creek, Spring Creek, and Trout Creek areas. These soils are deep and well drained. They formed in alluvium, colluvium, glacial till, and in material derived from shale. This group of soils is used mainly as woodland, wildlife habitat, and some rangelands.

Deposition of alluvial fans and terraces are on-going. Soils in the assessment area are mainly sandy loams, loams and clay loams and can be very deep.

Findings, Analysis and Recommendations

Procedure to determine conformance with Standard

The uplands were assessed on an allotment basis according to Interagency Technical Reference 1734-6 *Interpreting Indicators of Rangeland Health*. This technical reference is available to the public to read or download on the BLM Library webpage, http://web.nc.blm.gov/blmlibrary. This qualitative process evaluates 17 "indicators" (e.g., soil compaction, water flow patterns, plant community composition) to assess three interrelated components or "attributes" of rangeland health; soil/site stability, hydrological function, and biotic integrity. The IDT visits specific ecological sites ("...land with specific physical characteristics which differ from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation...") and rates each indicator on the degree of departure-if any-from what is expected for the site. The rating for each indicator is then weighed to determine the degree of departure of the 3 attributes of rangeland health.

The Natural Resource Conservation Service has developed Ecological Site Descriptions based on specific soil types, precipitation zones and location. They describe various characteristics and attributes including what vegetative species, and relative percentage of each, are expected to be present on the site. The IDT refers to these site descriptions while completing the upland evaluation matrix.

Members of the IDT visited all 14 grazing allotments, un-allotted and un-leased public land in the EBW, during 2008 and completed 10 rangeland health indicator evaluation matrices. In addition, 10 Daubenmire trend studies established in the 1970s and early 1980s were duplicated in 2007 and 2008 to help determine vegetative trends. The data collected was summarized and compared to baseline data providing supporting information for interpreting the upland indicators.

The EBW was evaluated for weed infestations using treatment records and inventories from the Dillon Field Office, the Madison County Weed Coordinator and our collective inventories and observations during the field assessments.

Findings and Analysis

Based on the evaluation methodology and process, comparative analysis of quantitative data collected at long term trend study sites and extensive field observations and discussions by the IDT, the uplands in all 14 grazing allotments in the EBW are in proper functioning condition.

Five grazing allotments in the assessment area, Spring Canyon, McHessor Creek, McHessor Creek Isolated, Garden Creek Isolated and Stone Creek are on the western front of the Ruby Mountains, and share similar topographical and ecological features. They have steep drainages and rocky canyons, substantial amounts of timber, and are well watered by major streams and

their tributaries. Much of the uplands in these allotments is relatively inaccessible secondary range and lightly grazed. The primary range along the interface of the forested highlands, and the grass and sagebrush benches is grazed by cattle and overall in very good ecological condition.

Data from 5 monitoring transects in 3 allotments indicate vegetative canopy has increased an average of 8% since the last time data was collected. Several other study sites were re-established because locator witness posts have been removed (vandalized) since last visited. Data at these sites was recorded to serve as baseline information for future comparative analysis of vegetative canopy trends.

Data recorded at 2 long term study sites in the Stone Creek allotment show an 8% average increase in overall cover. Most of that can be attributed to an increase in mountain big sagebrush canopy. The average percent canopy of sage changed from 6.3% in July of 1979 to 13.5% in 2007, a 7% increase. The relative amount of key herbaceous species bluebunch wheatgrass and Idaho fescue is static or slightly down. Bluebunch canopy is down from 3.5% to 2%, and Idaho fescue is basically static from 20% in 1979 to 21 % in 2007.

Comparative data on 2 long term trend studies in the McHessor Creek allotment show an increase in plant canopy cover. One transect, located in a high meadow above the spring source for McHessor Creek, has a 15 % increase in canopy since last read in 1988. Both sagebrush and bluebunch wheatgrass are trending up, while some forbs such as lupine, yarrow, and phlox have decreased.

Another study located in a high meadow adjacent to upper Spring Creek had to be re-established in 2007. Data comparisons are difficult because the location of the new and old transect are not identical, but generlly canopy cover is trending higher. The grass species mountain brome *(Bromus marginatus)*, not present in past years, now comprises almost 14% of the total canopy measured. The canopy of another herbaceous plant, Sandberg bluegrass, has increased almost 10% since 1988. However, this data may be misleading because the precise location of the measured individual plants was not duplicated due to the slightly different transect location.

Upland studies in the Middle Fork allotment show downward trends. The relative canopy cover in 2 studies show an average decrease of about 8% and a third transect shows a sharp decrease from 67% to 42 % between readings in 2002 and 2007. Data collected at this site in 2007 is ambiguous. For instance, canopy of Bluebunch wheatgrass (a desirable livestock forage that decreases under heavy grazing) has increased from 1.1% to 2.3% during the last five years, but it has declined 5.6% between 1979, when the study was established, and 2007. On the other hand, canopy cover of Idaho fescue, another desirable native grass that increases under heavy grazing, declined about 7% between readings in ’02 and ’07 (23.2 to 15.9%). Other key species such as Mountain brome *(Bromus marginatus)* and Prairie junegrass *(Koeleria macrantha)* also declined, as did virtually every species measured. These 3 studies may not be representative of overall pasture or allotment conditions. All three studies are located near roads, in relatively high cattle use areas, and/or on rocky ridges in less productive ecological sites. The vast majority of the uplands the allotment are in good condition and were found to be properly functioning by the IDT.

Changes in the total percentage of canopy cover on a given site may be affected by many interacting variables. Combinations of annual weather, natural plant mortality, grazing utilization, plant disease, wildfire, weed treatments, recreational use and other activities all affect ecological processes to some degree and contribute to changes (both positive and negative) to plant composition and vigor, soil stability, and biotic integrity. Ecological systems are dynamic, and change is natural and constant.

Noxious weeds and invasive species are found in disturbed areas, such as roads, power line easements, and old mines throughout the watershed.

Table 4 outlines the findings at 10 ecological sites, where the IDT completed the 17 question upland evaluation forms. A moderate departure from expected conditions is analogous to functional at risk rating (DOI BLM 2000). Upland sites are considered to be in proper functioning condition if they are in none-to slight or slight-to-moderate departure from expected conditions.

Table 4: Upland Qualitative Assessment Summary

Allotment Name & Study Number	*Ecological Site*	*Plant Association*	*Degree of Departure from Expected*		
			Soil Site Stability	Hydrologic Function	Biotic Integrity
Hoffman Creek Isolated 07S07W2601	Silty 15-19	Mountain Big Sagebrush/Idaho Fescue	None to Slight	None to Slight	None to Slight
Lark Isolated 08S06W2401	Shallow 10-14	Mountain Big Sagebrush/Idaho Fescue	Slight to Moderate	None to Slight/Slight to Moderate (liner)	None to Slight
McHessor Creek 06S05W2901	Silty 15-19	Mountain Big Sagebrush/Idaho Fescue	None to Slight	None to Slight	None to Slight
McHessor Creek 07S06W0301	Silty 15-19	Mountain Big Sagebrush/Idaho Fescue	None to Slight	None to Slight	Slight to Moderate
Middle Fork 07W06W2301	Silty 15-19	Mountain Big Sagebrush/Idaho Fescue	None to Slight	Slight to Moderate	None to Slight
Middle Fork 07S06W3401	Silty 15-19	Mountain Big Sagebrush/Idaho Fescue	None to Slight	None to Slight	None to Slight
Middle Fork 07S06W3301	Silty 15-19	Mountain Big Sagebrush/Idaho Fescue	None to Slight	None to Slight	Slight to Moderate
North Fork AMP 09S05W1201	Limey 10-14	Idaho Fescue/Bluebunch Wheatgrass	None to Slight	None to Slight	None to Slight
Stone Creek 07S06W2101	Shallow Gravely 10-14	Mountain Big Sagebrush/Idaho Fescue	None to Slight	None to Slight	None to Slight

Allotment	*Ecological*	*Plant*	*Degree of Departure from Expected*		
Stone Creek 07S06W1001	Silty 15-19	Mountain Big Sagebrush/Idaho Fescue	None to Slight	None to Slight	None to Slight

Travel Management

Roads in Spring Creek, Ladder Canyon (Big Dry), and Stone Creek, were identified for travel management review. Any potential changes will be considered and analyzed in a subsequent environmental assessment. Refinements, if implemented, would not substantially change the miles of open roads on public land or access opportunities.

Recommendations for Upland Health

1. Revise the terms and condition for livestock grazing in the Middle Fork allotment. Changes to season of use, length of season, numbers of allocated AUM's and numbers of authorized cattle will be analyzed.

2. Within budgetary constraints, continue or increase the use of Integrated Weed Management tools to treat noxious weeds within the EBW. Spotted knapweed is the highest priority for treatment. Continue to work cooperatively with Madison County, other agencies, landowners and partners to manage noxious weeds within the watershed. Continue an aggressive educational program which emphasizes identification and preventative measures.

3. Work to re-establish the community spray days held on Garden and McHessor Creeks in 2003, and add Stone Creek to the treatment area.

4. Suggested changes to motorized route designations, in the general area of Spring Creek, Ladder Canyon (Big Dry), and Stone Creek, will be addressed in the East Bench Watershed EA.

Riparian and Wetland Areas

Western Montana Standard #2: *"Riparian and wetland areas are in proper functioning condition"*

Affected Environment

Riparian/Wetland Habitat Types

A comprehensive classification system of wetlands and deepwater habitats developed by the U.S. Fish and Wildlife Service (Cowardin et al., 1979) defines wetlands by plants (hydrophytes), soils (hydric soils), and frequency of flooding. The structure of the "Cowardin" wetland classification is hierarchical, progressing from Systems and Subsystems, at the most general levels, to Classes, Subclasses, and Dominance Types. *Systems* refer to a complex of wetlands and deepwater

habitats that share the influence of similar hydrologic, geomorphologic, chemical, or biological factors while *Class* describes the general appearance of the habitat in terms of either the dominant life form of the vegetation or the physiography and composition of the substrate.

Two Cowardin wetland systems, Riverine and Palustrine, are found on public lands within the EBW. In general terms the Riverine System includes all wetlands and deepwater habitats contained within a channel that have less than 30% vegetative cover. The Beaverhead River is an example of a Riverine System, as are smaller streams with little or no vegetative cover within the EBW. Since the majority of the riparian and wetland areas within the EBW have greater than 30% vegetative cover, they fall into the Palustrine System. The Palustrine System includes all non-tidal wetlands dominated by vegetation (> 30% areal coverage).

Three classes of the Palustrine System are found in the EBW: Emergent Wetlands, dominated by emergent herbaceous vegetation; Scrub-Shrub Wetlands, dominated by shrubs or small trees; and Forested Wetlands, dominated by trees over 20 feet tall. The Beaked Sedge habitat types scattered along stream reach 425 of Trout Creek are examples of Emergent Wetlands. The Douglas-fir/Red-oiser Dogwood habitat types along Big Dry Creek (BLM stream reaches 880 and 881) are examples of Forested Wetlands and the Geyer Willow/Beaked Sedge habitat type found on the West Fork of Sage Creek (reach 432) provides an excellent example of a Scrub Shrub wetland.

Soils

Hydric soils are a small component of the landscape. Like riparian areas and wetlands, they play an important role in ecological processes. Hydric soils are those soils that are affected by prolonged exposure to water. They are most often associated with soils that are poorly drained or very poorly drained. Hydric soils are commonly found in depressions and drainage ways. They are also found in floodplains, springs, wet meadows and marshes. In the EBW < 1% of the soils are hydric soils.

Rivers and Streams

There are approximately 19.5 stream miles flowing through public land within the assessment area (**Map 3)**. The majority originate on the western slope of the Ruby Mountains and flow across the East Bench. As surface water and/or groundwater they eventually run into Beaverhead River. The primary streams in the EBW are McHessor Creek, Spring Creek, Stone Creek and Trout Creek. Each of these creeks includes numerous tributaries. Additional steams include Carter, Hoffman and Sage Creeks. Sage Creek is the only stream in the assessment area flowing, by way of Sweetwater Creek, to the Ruby River.

Findings, Analysis and Recommendations

Procedure to determine conformance with Standard

BLM policy specifies using several complimentary monitoring and evaluation methodologies to determine conformance with the Riparian Health Standard. The IDT is required to use the Lotic and Lentic Riparian Area Management Assessment Methodologies (TR 1737 15 and 16), also known as PFC Assessment Methodologies, to evaluate riparian systems and wet meadows. A Guide to Managing, Restoring, and Conserving Springs in the Western United States (TR 1737-17) was used for springs. These technical references are available to read, or download, on the BLM Library webpage, http://web.nc.blm.gov/blmlibrary.

The PFC lotic assessment evaluates stream geometry, channel morphology and stability, hydrological function, riparian vegetative condition, as well as soil erosion and deposition. Applicable portions of the lentic methodology were used to assess springs and wet meadows. During the summer and fall of 2008 the IDT walked 38 stream reaches, flowing through approximately 19.5 miles of public land, and visited most of the springs and wetlands within the watershed and completed PFC evaluations on each.

Many of the riparian areas in the assessment area were originally described, and mapped, based on aerial photos and USGS topographical maps. Subsequent ground-truthing has verified that a number of drainages previously mapped as riparian habitat are actually dry washes which lack riparian characteristics. These reaches have been removed from the stream/wetland inventory. Conversely, several stream reaches previous not identified were assessed and added to the BLM riparian data base during the assessment process.

Thirty four of the stream reaches were inventoried using the Montana Riparian Wetland Assessment (MRWA). Data was collected during the 2007 and 2008 field seasons prior to the Interdisciplinary team's PFC assessments. The MRWA inventories and measures physical and vegetative characteristics, streambed materials, and measures channel dimensions (bank full width, mean bank full depth, flood prone width). Physical measurements are utilized to assess channel morphology and stability and tentatively classify streams at Rosgen Level II (Rosgen is a commonly used stream classification system, see Glossary). MRWA also observes and records the composition, cover, vigor and the amount of recruitment and regeneration of all vegetative species within the riparian zone. The data gathered was used by the IDT in conjunction with the PFC assessment process to ascertain riparian health and trends on a reach by reach basis.

The Riparian Cover Board monitoring method was used to evaluate changes in woody riparian vegetative cover on Stone Creek, the Left Fork and the Middle Fork of Stone Creek. The Riparian Cover Board system measures changes in woody species cover. Seasonal staff re-read 6 established Cover Board plots prior to the interdisciplinary team's assessment. This data, along with the photographic record associated with Cover Boart studies was used by the IDT to help determine vegetative trend.

Also, new data was recorded at two Greenline monitoring transects, established on the Middle Fork of Stone Creek in 2002. Greenline studies record the changes in major riparian plant associations growing immediately adjacent to the channel.
Summaries of data collected using MRWA, Cover Boards, and the Greenline monitoring methodologies are included in the East Bench Watershed project file and available for review at the Dillon Field Office.

Federal protection of wetlands and riparian systems, including springs, became official policy under the authority of two Executive Orders issued in 1977. Many of the developed springs in the EBW were developed prior to the issuance of these orders or other federal laws, directives or regulations for the management and protection of wetlands (Mitch 2007). Current management direction emphasizes minimizing wetland degradation as well as preserving and enhancing natural processes. Spring developments are evaluated to determine whether hydrology, hydric soils and hydric vegetation are being maintained. Protection of ecological functions and processes of springs and seeps are specifically addressed in the Fundamentals of Rangeland Health and Standards for Grazing Administration. Management, restoration and conservation of springs are resource management objectives for the BLM.

The National Wetland Inventory (NWI) has not been completed for the State of Montana (FWS 2007). Wetland mapping in Southwest Montana is limited. There is no NWI coverage for the EBW. In recognition of the need for a comprehensive wetland inventory, the Montana/Dakotas BLM is working with and providing funding to Montana Natural Heritage Program to update and ground truth NWI information. Once the mapping is complete, the information will be available in digitized form. Digitized NWI information will greatly assist the BLM to quantify wetland resources in the future. Absent this information, the BLM IDT assessed known wetland areas as well as inventoried areas likely to incorporate wetland resources.

Historically, the sole purpose for spring developments was to provide water for livestock. In many instances the spring source was not fenced or protected from degradation by ungulates which has resulted in altered hydrological function and diminished resource values. There are six developed springs in the EBW; four are in the Stone Creek Allotment and two in the Middle Fork Allotment. In order to provide information regarding impacts to riparian habitat associated with these projects, the IDT did a comprehensive inventory of developed springs in the EBW.

Findings and Analysis

The IDT concluded that riparian conditions along 25 of 38 assessed stream reaches in the EBW, flowing 9.8 miles, are in proper functioning condition (PFC). One stream reach, flowing 0.8 miles, is functional at risk (FAR) with an upward trend. The riparian condition on 8 reaches, flowing 7.7 miles, is FAR with a downward or static trend. The riparian conditions on the remaining 4 stream reaches, covering 1.2 miles are non-functional (NF).

Table 5 below summarizes the functional status of all the surveyed stream reaches in the EBW.

Table 5: Functional Status of Streams Reaches

Stream Name	Allotment	BLM Reach ID	Vegetative Community Type	Functional Rating & Trend	Miles
Big Dry	Garden Creek Isolated	880	Douglas Fir/Red-osier Dogwood	FAR/Static	2.14
Big Dry	Unallotted in WSA	881	Douglas Fir/Red-osier Dogwood	FAR/Static	1.26
Carter Creek	Carter Creek	433	Quaking Aspen/Red-osier Dogwood	PFC	0.30
Carter Creek	Carter Creek	434	Quaking Aspen/Red-osier Dogwood	PFC	0.10
Hoffman Creek tributary	Big Sheep	429	Quaking Aspen/Red-osier Dogwood	PFC	0.32
Hoffman Creek tributary	Big Sheep	431	Geyer Willow/Beaked Sedge	PFC	0.25
Hoffman Creek tributary	Carter Creek	430	Quaking Aspen/Red-osier Dogwood	PFC	0.29
McHessor Creek	McHessor Creek	424	Geyer Willow/Beaked Sedge	PFC	0.26
McHessor Creek tributary	McHessor Creek	443	Spruce/Red-osier Dogwood	FAR/Up	0.80
McHessor Creek tributary	McHessor Creek	444	Spruce/Red-osier Dogwood	PFC	0.43
McHessor Creek tributary	McHessor Creek	449	Spruce/Red-osier Dogwood	PFC	0.24
Middle Fork tributary	Stone Creek	410	Douglas Fir/Red-osier Dogwood	PFC	0.49
Sage Creek West Fork	Nyhart	432	Geyer Willow/Beaked Sedge	PFC	0.75
Spring Creek	McHessor Creek	400	Douglas Fir/Red-osier Dogwood	FAR/Down	0.57
Spring Creek tributary	McHessor Creek	442	Spruce/Red-osier Dogwood	PFC	0.39

Stream Name	Allotment	BLM Reach ID	Vegetative Community Type	Functional Rating & Trend	Miles
Spring Creek tributary	Stone Creek	401	Rocky Mountain Juniper/Red-osier Dogwood	NF	0.32
Stone Creek	Unleased	421	Geyer Willow/Beaked Sedge	NF	0.23
Stone Creek	Stone Creek	403	Douglas Fir/Red-osier Dogwood	PFC	0.54
Left Fork of Stone Creek	Stone Creek	441	Douglas Fir/Red-osier Dogwood	PFC	0.51
Left Fork of Stone Creek	Stone Creek	419	Douglas Fir/Red-osier Dogwood	PFC	0.91
Left Fork of Stone Creek tributary	Stone Creek	412	Rocky Mountain Juniper/Red-osier Dogwood	NF	0.30
Left Fork of Stone Creek tributary	Stone Creek	448	Quaking Aspen/Red-osier Dogwood	NF	0.30
Left Fork of Stone Creek tributary	Stone Creek	413	Douglas Fir/Red-osier Dogwood	PFC	0.45
Left Fork of Stone Creek tributary	Stone Creek	417	Douglas Fir/Red-osier Dogwood	PFC	0.48
Stone Creek tributary	Stone Creek	414	Geyer Willow/Beaked Sedge	PFC	0.36
Stone Creek tributary	Stone Creek	415	Douglas Fir/Red-osier Dogwood	FAR/Static	0.75
Stone Creek tributary	Stone Creek	446	Douglas Fir/Red-osier Dogwood	PFC	0.70
Stone Creek tributary	Stone Creek	447	Douglas Fir/Red-osier Dogwood	PFC	0.20
Middle Fork of Stone Creek	Middle Fork	404	Rocky Mountain Juniper/Red-osier Dogwood	PFC	0.27
Middle Fork of Stone Creek	Middle Fork	406	Quaking Aspen/Red-osier Dogwood	PFC	0.43

Stream Name	Allotment	BLM Reach ID	Vegetative Community Type	Functional Rating & Trend	Miles
Middle Fork of Stone Creek	Middle Fork	407	Geyer Willow/Beaked Sedge	PFC	0.19
Middle Fork of Stone Creek	Middle Fork	408	Geyer Willow/Beaked Sedge	FAR/Down	1.64
Middle Fork tributary	Middle Fork	409	Quaking Aspen/Red-osier Dogwood	PFC	0.54
Mine Gulch	Stone Creek	410	Douglas Fir/Red-osier Dogwood	PFC	0.16
Mine Gulch	Stone Creek	450	Douglas Fir/Red-osier Dogwood	PFC	0.21
Trout Creek	McHessor Creek	425	Geyer Willow/Beaked Sedge	FAR/Static	0.87
Trout Creek	McHessor Creek	426	Quaking Aspen/Red-osier Dogwood	FAR/Down	0.28
Trout Creek	McHessor Creek	440	Douglas Fir/Red-osier Dogwood	FAR/Static	0.22

Streams

The IDT observed various riparian health concerns on some reaches including: alteration of stream morphology (channel shape and gradient) with resultant over-widening, loss of access to floodplains, and bank down cutting. Impacts to vegetation included some loss of species diversity and composition, reduced vegetative cover, limited species recruitment and regeneration, reduced structural diversity and decreased vigor of streamside vegetation. Increasing juniper cover is adversely affecting deciduous riparian habitat on some streams in the EBW assessment area.

Reach specific findings are described below. Additional stream reach specific data is available at the Dillon Field Office.

Big Dry Creek (reaches 880 & 881)

Big Dry Creek, also known as Ladder Canyon, originates in the Ruby Wilderness Study Area and flows down a steep narrow canyon into the Garden Creek Isolated Allotment. The stream gradient is steep, and in some place an old road runs adjacent to the stream. Both BLM stream reaches are classified as Rosgen Level II stream types A and B. Stream bed materials include

bedrock, boulder and cobble. Engelmann spruce occurs in the higher elevations, and Douglas fir dominates lower elevations.

Livestock trailing in the canyon for many years has negatively impacted the channel by trampling, sediment inputs and channel over widening. All terrain vehicles (ATV) use within the streams channel have severely impacted stream banks and contributed to over widening. Over widened streams lose their ability to maintain channel morphology and their capability to process sediment and flows. In some locations the stream is out of its natural channel and flowing down the road.

The ID Team determined that Big Dry Creek is functioning at risk with a static trend.

In 2008 a new range user was issued the grazing lease for Garden Creek Isolated. The new lessee has discontinued trailing cattle up Ladder Canyon to public lands on the east side of the Rubys. This management change, if permanently implemented, will remove one of the primary sources of riparian habitat degradation along Big Dry Creek.

Carter Creek (reaches 433 & 434)

Carter Creek flows through the Carter Creek allotment south of the Sweetwater Road (T8S R7W section 11).

Riparian components on reach 434 are functioning well and rated PFC.

Reach 433 is also properly functioning. However, some juniper is beginning to crowd out the more desirable deep rooted deciduous species. Also, sedge, a deep rooted and bank stabilizing herbaceous species, is reduced in some isolated locations. The channel is over widened at a few crossings.

Hoffman Creek (reaches 429, 430, and 431)

The IDT found all three Hoffman Creek tributaries are in PFC. Reach 431 flows into 429. They are classified as Rosgen Level II A2, B2 and B3. Reach 430 in the Carter Creek Allotment originates from a number of seeps and springs in an aspen stand. A slump midway down the drainage temporarily divides the stream channel, but it comes together again further downstream. Cheatgrass was observed on south facing slopes and is a concern.

McHessor Creek (reaches 424, 443, 444, 449)

Reach 424 is located on the main channel of McHessor Creek, and 443, 444 and 449 are tributaries. Three reaches are in PFC and one is FAR with an upward trend. Reach 424 is functioning properly, however recruitment of willows and aspen is less than desired and the stream channel is over widened in a few places. Reaches 444 and 449 are also in PFC. The forest in this area does not appear to have been logged because some of the standing and down Douglas-fir stems have inordinately large diameters. Heavy downfall along 449 makes the reach very difficult to access or traverse. Reach 443 is functioning at risk, but rated very close to PFC.

The majority of the reach runs through conifer habitat and is functioning properly, but the channel is at risk from over widening in a few open meadows.

West Fork of Sage Creek (reach 432)

The west fork of Sage Creek flows through a steep and rocky canyon. The reach, located in the Nyhart alltoment, is functioning properly. However, beavers have severely reduced aspen stands. Juniper trees on the adjacent uplands are creeping down into the riparian zone.

Spring Creek and tributaries (reaches 400, 401, 442)

Two Spring Creek reaches are in the McHessor Creek allotment (400 and 442) and one is in the Stone Creek allotment (401).

Reach 400 is FAR with a downward trend. It is located within an old timber sale dating to the mid 1990s. Old roads, log crossings and culverts are negatively impacting the stream and limiting its ability to perform its natural functions. Sinuosity, gradient and channel dimensions (width/mean depth) are not appropriate for the landscape setting. Over widening is reducing the streams ability to maintain its geometry and process its sediments.

Reach 442, which feeds into 400, is PFC.

Reach 401, in the Stone Creek Allotment, is a series of springs and spring brooks with no channel connecting the springs. The springs and spring brooks are heavily impacted by livestock. The ID Team determined that this resource was functioning at risk.

Stone Creek (403, 415, 419,421)

There are several reaches on public land on the main fork of Stone Creek.

In late 1990's an extensive two phase stream restoration project on the main fork of Stone Creek was initiated. The project was a collaborative effort involving local, state, and federal agencies, private land owners, Barretts Minerals, and the Beaverhead Watershed Committee. BLM reach 403 flows through a portion of the restored habitat. The stream restoration and associated livestock management changes have greatly improved the stream by adding complexity to the stream which has benefitted the westslope cutthroat trout population. The project has been successful in restoring the streams hydrological functions and riparian vegetative health. The recent photographic record at this site shows a very strong upward trend, both in woody riparian cover, as well as channel morphology. The riparian health of reach 403, in the collective opinion of the IDT, has improved to PFC.

Reach 421 is located in an un-leased quarter section bisected by the Stone Creek road in T6S R7W section 34. The reach is included in a large private tract and for decades has been used in conjunction with the private land owner's livestock operation. Livestock use, including calving in the area, has compromised the riparian habitat, characteristics and values. The willows are

dead or dying, the stream bank severely damaged and the channel course has been altered and entrenched. This quarter mile of Stone Creek is non-functional.

Left Fork of Stone Creek and Tributaries (412, 415, 448)

There are 2 reaches on the main stem of the Left Fork and 8 associated tributaries.

The main fork reach, 419, flows about one mile from the toe of the Treasure Mine tailings pile, onto the private land in section 21. Over the years nearly one mile of stream has been lost to mine expansion. Flow in this section of the Left Fork of Stone Creek has been impacted by the mining operation. Montana DEQ has a NPDES Permit with Barretts Minerals regulating pollutant levels into the stream. In the late 1990s the haul road to the mine was routed to the northwest, the floodplain was reestablished and the stream was restored. The cover board transect along this reach shows a substantial increase in cover of plain leaf willow in every size class. The photos also show a very strong upward trend. The IDT concluded that the riparian habitat and physical attributes of the reach to be in PFC.

Riparian health on the various Left Fork tributaries, mostly located north and east of the Treasure Mine, range from PFC to non-functional. Two reaches, 412 and 448, which are sections of the same stream separated by private and state land, are currently non-functional. They flow through a steep draw and the system was devastated by an intense weather event in the early 1980s. The stream banks were washed away and the channel was severely down cut. In some places the stream is entrenched 6 to 8 feet. The stream naturally seeks a stable state, forming a new channel within the old, but juniper encroachment and livestock impacts are inhibiting the process.

Reach 415, like reach 419, is reduced in length due to the haul road. The creek channel is over widened in places reducing its capacity handle sediment loads naturally. Cover board transect data indicate that Bebb willow cover decreased from 1990 to 1996, but increased from 1996 to 2007. Sedges decreased from 1990 to 1996 (25% - 15%) but increase to 55% cover by 2007. The aspen at this transect died. Photos show an increase in Douglas-fir, but indicate an upward riparian trend. The reach is functioning at risk with a static trend (upward or downward trend is presently not distinguishable).

The remaining five reaches in the Stone Creek allotment are in PFC. Data and photographic records show that these reaches have improved substantially since the mid 1990s when livestock management was revised and restoration efforts were initiated.

Middle Fork of Stone Creek (404, 405, 406, 409, 407, 408, 409, 410, 423, 450)

The headwaters of the upper Middle Fork originate from two spring sources and tributaries. One of the tributaries is outside the watershed boundary.

Reach 409's spring source is now under the reclaimed Beaverhead Mine. Most of the stream has been covered by the Beaverhead Mine waste dump. The remaining portion, approximately ¼ mile, is functioning properly. Cover board data show a decline in woody species cover, but photos show an increase in herbaceous cover. The BLM has not authorized livestock grazing in

the Mine Pasture of the Middle Fork allotment for the past several years. The IDT noted substantial moose sign and observed a cow and calf moose along this reach during the field assessment, which may help explain the reduction in willow cover.

Reach 409 flows into 408 which is the longest reach in the Middle Fork allotment, spanning 1.6 miles. The IDT concluded that the reach is FAR with a downward trend. The riparian habitat and stream hydrology is relatively better in the upper portion of the stream, but in some places the channel is wider and shallower than it should be. Down cutting of the stream bed is occurring in the lower part of the reach. The stream is not able to maintain its geometry nor is it able to process sediment inputs efficiently. Cover board data, greenline monitoring data and photos support the IDT's downward trend call.

In 2004 a riparian fence was constructed on the lower portion of reach 408 creating a new reach, 407. Riparian conditions are now PFC within the exclosure. Deep rooted willows and sedges are re-establishing along the channel which is reducing bank degradation and reducing sediment inputs into the system. The channel is also becoming narrower and deeper which helps raise the water table, increase water storage, decrease water temperature and provide fish habitat.

The remaining reaches and associated tributaries are PFC (404, 405, 406, 410, and 450).

Trout Creek (425, 426, 440)

There are three reaches associated with Trout Creek, 425, 426 and 440. All three reaches were functioning at risk. Reaches 425 and 440 are FAR static, and 426 is FAR with a downward trend. Excessive browsing by ungulates on woody riparian species is negatively impacting regeneration of aspen and willows. Livestock are impacting the stream channel. There is evidence of bank shearing with a resultant shift in width/depth ratio. Changes in channel geometry are reducing the streams ability to maintain its dimensions as well as process its sediments and flows.

Developed Springs

Springs were inventoried to determine flow, wetland function, infra-structure condition. There are four springs in the Stone Creek Allotment: Left Fork North, Left Fork South, Middle Fork and Spring Creek. Spring Creek Spring has good flow, the wetlands were properly functioning, the exclosure is adequately sized and in good condition. Left Fork North and South Springs and Middle Fork Spring need repairs to both the troughs and the exclosures. Middle Fork Spring was developed in a Palustrine wetland approximately one acre in size. The riparian vegetation is diverse and includes aspen, Bebb willow, water birch and Woods rose as well as Nebraska sedge. The hydrologic function in this wetland has been negatively impacted by soil compaction, which has reduced its water holding capacity. Vigor and regeneration are diminished by trampling and browsing. There are two spring developments in the Middle Fork Allotment: Pond Pasture Spring and Stone Creek Spring. The Pond Pasture spring is properly functioning, has good flow, and is protected by an exclosure fence in good condition. Stone Creek Spring has an undersized exclosure which has deteriorated. Livestock traffic in the area has negatively impacted wetland

functions and woody vegetation health. The exclosure needs to be reconstructed and the stock tank needs to be replaced.

Recommendations for Riparian Health

1. Authorized livestock grazing is contributing to unacceptable riparian habitat conditions in Garden Creek Isolated, McHessor Creek, Stone Creek (reaches 412 and 448), and Middle Fork allotments. In accordance with BLM regulations, new allotment management plans (AMPs) addressing grazing management in these allotments will be evaluated in an EA. Changes in timing, duration, frequency and/or intensity of grazing will be considered. Additional rest and/or deferment may be incorporated into grazing plans in these allotments. Salting locations, herding, and/or applicable range improvement projects should be examined to determine how these tools can be used to mitigate riparian issues.

2. Close Big Dry Canyon to cattle trailing to mitigate unacceptable riparian conditions on reach 880 within the Garden Creek Isolated allotment and reach 881 upstream in the Ruby Mountain WSA.

3. Develop alternative management measures that will improve stream bank stability, increase riparian vegetation (woody and/or herbaceous), and decrease sediment input where these concerns were identified from causes other than livestock grazing (juniper expansion, roads, unhealthy forest conditions etc.).

4. Work with Madison County, Ruby Conservation District, Ruby Watershed Committee, DEQ, NRCS, mining companies, and other interested parties to address riparian concerns that cross administrative boundaries.

5. Expand exclosures around spring developments to incorporate the spring source and a portion of the spring brook where existing exclosures are not adequately protecting spring sources.

6. Investigate the feasibility of disposing of the quarter section containing reach 421 (T6S R7W section 34 NWNE).

7. Consider riparian juniper treatments on reaches 412 and 448 in the Stone Creek allotment. And, explore the feasibility of working collaboratively work with Montana State DNRC and a private landowner to include the segment of this stream flowing through State and private lands in T7S R6W sections 16 SW and 15 NWNW.

Water Quality

Western Montana Standard #3: *"Water quality meets State standards"*

Affected Environment

The EBW drains the western and southern slopes of the Ruby mountain range. Topography varies from rolling sage and grass covered bench lands to high alpine slopes. Land uses include grazing, mining, logging and recreation. Stone Creek, Trout Creek, Spring Creek and McHessor Creek and their tributaries bisect the landscape through deep drainages and ravines eventually flowing into the Beaverhead River. Sage Creek is the only stream reach which does not flow to the Beaverhead. Sage Creek flows into Sweetwater Creek and eventually joins the Ruby River. Average annual precipitation within the watershed varies from about 12 inches on the lower benches to more than 24 inches in the higher elevations of the Ruby Mountains. Treasure Mine, an active open pit talc mine, is located in the Left Fork Stone Creek drainage. Beaverhead Mine, an inactive open pit mine, has been reclaimed. Beaverhead Mine drains to the Middle Fork of Stone Creek.

Nonpoint Source Pollution (NPS) is the leading cause of surface water impairments in Montana. NPS pollutants are generated by the same land uses that have traditionally driven the state's economy, including grazing, logging, mining, roads and many other activities (MTDEQ 2007). Grazing on pasture and rangeland is one of the state's leading sources of NPS pollution. Principle pollutants of concern associated with grazing activities are bacteria, nutrients, sediment, and stream temperature alteration.

Findings, Analysis and Recommendations

Procedure to determine conformance with Standard

The Montana Department of Environmental Quality, Water Quality Planning Bureau, and Watershed Protection Section provide guidance on assessing water quality in relation to NPS. Montana DEQ recognizes PFC as a qualitative method of assessing the condition of riparian-wetland areas. DEQ believes PFC is an effective tool for riparian assessment and evaluation of the impacts of grazing management on riparian health. Montana's NPS Agricultural Strategy for Pasture and Range Lands supports the Bureau of Land Management's use of PFC for assessment. Montana DEQ publishes a Water Quality Report (MWQR) every two years. The 2008 water quality report will be available in 2009. Therefore, information in this section is based upon the 2006 water quality report.

Findings and Analysis

In conducting watershed assessments, the BLM evaluates uplands for land cover (ability of plants, rocks, litter to protect soil from erosion, promote infiltration and reduce runoff). PFC facilitates evaluation of channel erosion. Channel morphology, width and depth, bed materials, condition of stream banks and riparian vegetation provide information used to assess stream

function, riffle stability, shear stress and sediment loads. While sediment is a major concern, bacteria from animal waste is also a concern. As with sediment, the less time livestock have access to streams translates to less manure generated bacteria.

According to Montana's 2006 integrated 303d/305b Water Quality Report, non point source pollution accounts for 90% of the stream and 80% of the lake impairments statewide. Atmospheric deposition is the leading cause of impairment to lakes. Stream nonpoint source pollution, however, is directly related to land use. Farms and ranches cover two thirds of the state and agriculture is Montana's leading industry. Pollutants from agricultural nonpoint sources include sediment, nutrients, salinity, thermal impacts, bacteria and pesticides.

Table 6: Montana DEQ 303-d listed streams within the EBW

Name	Beneficial Uses	Probable Sources of Impairment	Probable Causes of Impairment
BEAVERHEAD RIVER, Grasshopper Creek to Jefferson River	Agricultural[1], aquatic life[3], cold water fishery[3], drinking water[1], industrial[1], primary contact recreation[3]	Agriculture, grazing in riparian or shoreline zones, loss of riparian habitat, site clearance (land development or redevelopment), impoundment, irrigated crop production.	Alteration in streamside or littoral vegetative covers, low flow alterations, physical substrate habitat alterations, sedimentation/siltation, temperature.
SPRING CREEK	Agricultural[2], aquatic life[2], cold water fishery[2], drinking water[3], industrial[1], primary contact recreation[2]	Agriculture, impacts from abandoned mine lands (inactive), irrigated crop production,	Alteration in streamside or littoral vegetative covers, arsenic, chlorophyll-a, low flow alterations, total nitrogen, sedimentation/ siltation.
STONE CREEK above confluence with unnamed creek near county line	Agricultural[1], aquatic life[2], cold water fishery[2], drinking water[1], industrial[1], primary contact recreation[3]	Agriculture, grazing in riparian or shoreline zones, irrigated crop production, highways/roads/ bridges/infrastructure (new construction), highway/road/bridge runoff (non-construction related),	Alteration in streamside or littoral vegetative covers, low flow alterations, nitrates, sedimentation/siltation. turbidity
STONE CREEK below confluence with unnamed creek near county line	Agricultural[2], aquatic life[2], cold water fishery[2], drinking water[3], industrial[1], primary contact recreation[2]	Agriculture, crop production (crop land or dry land), unspecified road or trail, surface mining.	Alteration in streamside or littoral vegetative covers, arsenic, chlorophyll-a, low flow alterations, nitrate/nitrite, phosphorus, sedimentation/ siltation.

[1] Fully Supporting, [2] Partially Supporting, [3]Not Supporting

The BLM understands that NPS pollution needs to be addressed for waters of the State regardless of whether they are meeting or are not meeting water quality standards. The BLM further understands that non-degradation rules apply to waters that meet state standards. Section 319 of the Clean Water Act addresses non-point source pollution through the application of Best Management Practices (BMPs). Allotment Management Plans (AMPs) are recognized as BMPs

to the extent they address non-point pollution (EPA2003). The BLM uses AMPs developed to improve riparian and upland conditions as an effective BMP to improve water quality. Western Montana Guideline #10 states "Livestock management should utilize Best Management Practices for livestock grazing that meet or exceed those approved by the State of Montana in order to maintain, restore or enhance water quality." For the EBW assessment, the IDT used a combination of methodologies to evaluate the watershed characteristics, as well as condition and function of floodplains, springs, streams, and wetlands. Upland, riparian and forest health assessments were used to determine how BLM management is affecting water quality. Upland indicators focus on condition and density of vegetative cover, erosion, and soil loss. Forest health indicators look at encroachment of conifers and loss of willow and aspen. Riparian indicators specific to streams evaluate channel dimensions, patterns and profiles, bed materials, access to floodplains, species composition and condition of riparian vegetation. Wetlands are assessed to determine their condition and ability to recharge groundwater, filter sediments and mitigate flooding. The assessment team looks for evidence of current and historic mining, abandoned beaver dams, erosion from roads.

Refer to sections on upland and riparian health above for PFC determinations and information that helps indicate where BLM resource conditions and/or authorized uses may be either contributing to or mitigating water quality impairment. The State makes Beneficial Use Determinations (BUD). The BLM shares their findings to assist DEQ in making BUDs.

Recommendations for Water Quality

Recommendations under Upland and Riparian Health above would also improve water quality.

1. Continue working with Montana DEQ and local Watershed Committees in the development and implementation of water quality restoration plans.

2. Continue to implement Best Management Practices to address NPS pollution.

3. Continue to share Watershed Assessment findings with DEQ.

Air Quality

Western Montana Standard #4: *"Air quality meets State standards"*

Affected Environment

The 1977 Amendments to the Clean Air Act resulted in the development of Air Quality Classes under the provisions of Section 160, Prevention of Significant Deterioration. The EBW is located within a Class II airshed. Class II airsheds are in attainment for all pollutants. Winds are predominantly out of the southwest, west and northwest.

Air Quality issues develop predominantly during wildfire season and center on sources of particulate emissions. Particulate Matter (PM), measured in microns, is a concern to human health. The closest population at risk in the vicinity is Dillon located southwest of the EBW in

Beaverhead County. Dillon's population in July of 2007 was 3594. Beaverhead County's population, also for July 2007, was 8804 with 47% living within a few miles of Dillon (City-Data.com). PM 10 and 2.5 are pollutants of concern. PM 2.5, because of its small size, can travel hundreds, even thousands of miles.

Findings, Analysis and Recommendations

Procedure to determine conformance with Standard

The Clean Air Act of 1990 as amended (42 U.S.C. 7401 et seq) and Executive Order 12088 requires the BLM to work with appropriate agencies to protect air quality, maintain Federal and State designated air quality standards, and abide by the requirements of State Implementation Plans.

The Environmental Protection Agency has delegated the authority to implement the provisions of the Clean Air Act to the State of Montana. Determination of compliance with air quality standards is the responsibility of the State of Montana. To address the issue of wildland fire, the USEPA developed the 1998 Interim Air Quality Policy for Wildland and Prescribed Fires which required states to develop smoke management plans. Montana and Idaho responded by forming the Montana/Idaho Airshed Group and by developing the Montana/Idaho Smoke Management Program.

Findings and Analysis

Air quality issues in the planning area center mainly around smoke. Smoke contributors in the planning area include wildfire, prescribed fires, private debris burning, agricultural burning, slash burning, and wood burning stoves and fireplaces. Wildfire can produce short-term adverse effects on air quality. Air quality and visibility can deteriorate due to temporary air stagnation during wildfire events, which are most common during the months of July, August, and September. Concerns regarding human health revolve around smoke from wildland and prescribed fire.

Prescribed burning is done in accordance with the Montana/Dakotas Fire Management Plan and is coordinated with MT DEQ and the Montana/Idaho Airshed Group. During prescribed fire season, the Smoke Monitoring Unit supports the Montana/Idaho Airshed Group to prevent or reduce the impact of smoke on area communities, especially when that smoke could contribute to a violation of national air quality standards. During the summer wildfire season, the Smoke Monitoring Unit assists state and local governments in monitoring smoke levels and providing information about smoke to the public, firefighters, and land managers.

Recommendation for Air Quality

1. Continue to follow Burn Plans and to coordinate with the Smoke Monitoring Unit.

Biodiversity

Western Montana Standard #5: *"Provide habitat as necessary, to maintain a viable and diverse population of native plant and animal species, including special status species"*

Affected Environment

The assessment area provides seasonal and year-long habitat for a wide variety of species. Wildlife uses are enhanced by the interspersion and diversity of grasslands, sagebrush, riparian, rocky outcrops and forested areas. Specific habitat conditions and associated recommendations are described in more detail above in the Upland Health and Riparian Health sections.

Sagebrush Habitats and Sagebrush Dependent Species

Sagebrush grassland habitat types are the dominant vegetation communities in the analysis area making up 70% of the total area. Mountain big sagebrush habitat within the assessment area supports a diversity of sagebrush-dependent wildlife species. This habitat provides crucial winter habitat for mobile wildlife species such as mule deer, pronghorn antelope, and sage grouse and nesting and foraging habitat for golden eagles and other raptors.

Sage grouse populations and sagebrush habitats have declined throughout the west due to significant losses range-wide from conversion for agricultural needs, livestock grazing, and wildland fire. Previous petitions for listing the sage grouse under the ESA emphasize the need for region-wide assessments addressing habitat conditions and population stability. It is critical to maintain the integrity of mid-to late-seral sagebrush habitats on public lands, not only for sage grouse but for all sagebrush obligate species. Sage grouse lek surveys indicate that bird numbers in the Sweetwater area have been stable in recent years. Sage grouse nesting usually occurs within two miles of the lek, where suitable habitat is available. Brood rearing habitats require a mix of forbs and insects for a high protein diet, usually in association with riparian habitats, and winter diets consist of almost exclusively of sagebrush. The *Management Plan and Conservation Strategies for Sage Grouse in Montana* completed by the Montana Sage Grouse Working Group will be used as a guideline for future management of sagebrush habitat.

Important sage grouse breeding and winter habitat is located south of the EBW in the Sweetwater area. Within the EBW, sage grouse use was noted in Nyhart, Hoffman Creek Isolated and Middle Fork allotments. Sage grouse use is likely in Big Sheep, Carter Creek and Lark Isolated due to favorable habitat and proximity to active leks in the Sweetwater Basin. Very little sage grouse use was noted in the remaining areas of the assessment area due to limited available habitat. One sage grouse was observed north of the Stone Creek allotment by the IDT. It was the first documented occurrence on BLM in this area.

With the exception of some old droppings located the Middle Fork allotment, there is no indication of pygmy rabbits in the assessment area. However, suitable habitat is present in the

assessment area and due to the proximity to the Sweetwater populations it is likely that some pygmy rabbit use occurs in the EBW.

Riparian, Aquatic and Wetland Habitat and Associated Species

Riparian habitats receive a disproportionate amount of wildlife use, approximately 75% of all wildlife species in this area utilizing riparian habitat for at least some portion of their annual life cycle. These riparian areas provide essential habitat for moose, elk, beaver, sage grouse brood rearing and neo-tropical migrant songbird nesting. Spring developments can provide a clean water source for wildlife, but have often proved to be fatal when escape ramps are not installed in them. As stated in the Riparian standard above some developments were found to be in disrepair, and were also lacking escape ramps for birds and small mammals. Wildlife remains were found in a few of these water troughs. Riparian areas provide essential habitat for moose, elk, beaver, sage grouse brood rearing and neo-tropical migrant songbirds.

Within the EBW there are 6 perennial streams on public land that support cold water fisheries. Common sport fish species in the area are brook trout (*Salvelinus fontinalis*), Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri)*, rainbow trout (*Oncorhynchus mykiss*), rainbow x cutthroat hybrids (*O. Mykiss x clarki lewisi*), and westslope cutthroat trout (*Oncorhynchus clarki*). Another native species, the mottled sculpin (*Cottus bairdi),* is found in most of the streams in the area.

Non-native species were introduced into the area in the late 1800's and early 1900's. Brook trout are the most common salmonid found in the assessment area occurring in most perennial waters capable of supporting cold water species. Rainbow trout and hybrid cutthroat are incidentally to commonly found in the lower to middle reaches of several streams. Table 7 shows fish streams and species within the EBW.

Table 7: Fish Streams in the EBW

Stream	Species Present
Trout Creek	WCT- genetics pending-likely hybridized, brook trout, mottled sculpin
Spring Creek	WCT-100%, brook trout, mottled sculpin
Stone Creek	WCT 100%, mottled sculpin
McHessor	WCT x rainbow hybrids, mottled sculpin, brook trout
Carter Creek	Brook trout
Hoffman Creek	Brook trout

Generalist or Widespread Species

The EBW provides habitat for migratory and resident elk. Elk and deer winter habitat is continuous along mid to lower elevations on the western slope of the Ruby Mountains. Hunting pressure, fall weather and winter snow depths throughout the area influence actual numbers and

timing of winter habitat use. Most elk calving habitat is located at mid elevation. Antelope are found throughout the assessment area in fair numbers. They are commonly seen on the lower elevation grassland benches, as well as in the scattered sage brush habitat throughout the assessment area. Moose are found throughout the watershed in low numbers with most use occurring close to riparian areas. Black bears and mountain lions are common in the watershed in forested and riparian habitats, and occasionally sagebrush habitat. Blue and ruffed grouse are found throughout the watershed in timbered and riparian habitats.

Table 8: Primary Game Species and Habitat Use within the EBW

Species	Forested	Sagebrush	Riparian
Antelope		**Y**	
Elk	**S,C**	**W,C**	**Y**
Moose	**Y**	**Y**	**Y**
Mule deer	**S,C**	**W,C**	**W**
Whitetail Deer	**S**	**S**	**Y**
Blue grouse	**Y**		**Y**
Ruffed grouse	**Y**		**Y**
Sage grouse	**S**	**Y**	**B**
Black bear	**Y**	**S**	**S**
Mountain Lion	**Y**	**Y**	**Y**

Y=yearlong, W=winter, S= summer, C=calving/fawning, B=breeding/brooding

Special Status Species

"Special Status Species" refers to both plants and animals and includes proposed species, listed species, and candidate species under the Endangered Species Act; State-listed species; and BLM State Director-designated sensitive species (USDI 2001). Special status species are vital to maintain watershed biodiversity. Table 9 lists all Special Status Species (animal and plant) that occur within the EBW during all or part of the year.

Table 9: Special Status Species within EBW

Animal Species	Current Management Status	Occurrence	Preferred habitat
Gray Wolf *(Canis lupus*)	Proposed threatened in experimental areas.	Transient	All
Bald Eagle (*Haliaeetus leucocephalus*)	Sensitive	Transient	Riparian/wetland

Ferruginous Hawk (*Buteo regalis*)	Sensitive	Resident	Sagebrush shrubland
Golden Eagle (*Aquila chrysaetos*)	Sensitive	Resident	Riparian/wetland Sagebrush shrubland
Great Gray Owl (*Strix nebulosa*)	Sensitive	Transient	Forest
Loggerhead Shrike (*Lanius ludovicianus*)	Sensitive	Resident	Sagebrush shrubland
Northern Goshawk (*Accipiter gentilis*)	Sensitive	Resident	Forest
Sage thrasher (*Oreoscoptes montanus*)	Sensitive	Resident	Sagebrush shrubland
Sage Grouse (*Centrocercus urophasianus*)	Sensitive	Resident	Sagebrush shrubland
Sage Sparrow (*Amphispiza belli*)	Sensitive	Resident	Sagebrush shrubland
Swainsons Hawk (*Buteo swainsoni*)	Sensitive	Resident	Riparian/wetland Sagebrush shrubland
Pygmy Rabbit (*Brachylagus idahoensis*)	Sensitive	Resident	Sagebrush shrubland
Prebles Shrew (*Sorex preblei*)	Sensitive	Resident	Sagebrush shrubland
Westslope cutthroat trout *(Oncorhynchus clarki lewisi)*	Sensitive	Resident	Streams
Plant Species	**Current Management Status**	**Known from BLM lands?**	**Habitat**
Ute Ladies' Tresses (*Spiranthes diluvialis*)	Threatened	NO	Riparian/Wetlands under 5000 feet
Mealy Primrose (*Primula incana*)	Sensitive	NO	Saturated, often calcareous wetlands and wet meadows
Taper-tip Desert-parsley (*Lomatium attenuatum*)	Sensitive	YES	South or west-facing slopes in mountains, canyons and foothills

Special Status Wildlife

Wolves present in southwest Montana have increased substantially since their reintroduction into central Idaho and Yellowstone National Park. No stable packs are currently known to occupy any habitat within the EBW. However, at least two packs are known to use areas on the east side of the Ruby Mountains. Rising wolf predation of livestock may result in increased levels of removal and/or relocation. This may preclude the potential establishment of stable packs in the

EBW. The state of Montana has developed a management strategy to implement when federal delisting occurs.

In response to a federal district court ruling, gray wolves were reinstated under ESA protections in all of Montana on July 18, 2008. Therefore, wolves will continue to be managed under the ESA non-essential experimental population regulations (10j rule). Montana FWP will continue to be the lead agency for wolf management activities in the state.

Grizzly bear use outside the Yellowstone Recovery Area is expanding and sightings have been reported nearby in the Centennial, Gravelly and Tobacco Root Mountains. There are no confirmed reports of grizzly bear in the EBW.

The likelihood of lynx use in the EBW is very low due to isolation from other populations and lack of suitable habitat.

Occupied habitat for wolverine exists in the Pioneer Mountains to the west, the Gravelly Mountains to the east, and potential occupied habitat exists in the Tobacco Root Mountains to the north. Given the wide-ranging movements of wolverine, it is possible that they also in the Ruby Mountains and the assessment area.

Bald Eagles nest along the Beaverhead, Big Hole, Jefferson and Ruby River corridors adjacent to the assessment area. Winter concentrations of bald eagles are found where prey is available, along open sections of the Beaverhead River. Cooperative interagency monitoring is occurring through the Montana Bald Eagle Management Plan. Recovery efforts for bald eagle and restrictions around nests have not inhibited current land use authorizations. Bald eagles have recently been de-listed from the ESA.

Historically, westslope cutthroat trout (WCT) were found in most streams in SW Montana. Competition with non-native eastern brook trout, hybridization with rainbow trout, Yellowstone cutthroat trout and habitat de-gradation have reduced pure populations of WCT to less than 3% of their historic range. The WCT in Montana is currently listed as a special status species by the State, Forest Service and BLM.

The Stone Creek system is the only drainage within the EBW that supports genetically pure WCT on public land. A population of possibly hybridized WCT can be found in Trout Creek. Genetics samples were collected for analysis during the 2008 field season and results are pending.

Special Status Plants

Ute Ladies' Tresses are a perennial orchid known from only a handful of occurrences in southwest and south central Montana in the Missouri, Jefferson, Beaverhead, Ruby and Madison River drainages. It is found in highly restricted microhabitats and is linked to shallow, stable groundwater in temporarily inundated emergent wetlands on private lands within the EBW. This species may be affected at some level by small water diversions, ditches, and irrigation discharges which are widespread. The invasion of noxious weeds near and into species habitat

poses a direct threat to the species through competition, habitat degradation and the potential impact of herbicides.

Mealy Primrose which is known from private wetlands associated with the Beaverhead River in the EBW is often found on the mesic microhabitats on the tops and sides of the hummocks. It is vulnerable to competition from noxious weeds and activities that alter the hydrology of occupied wetlands. The effects of livestock grazing on Mealy Primrose appear to be both positive and negative. Mealy Primrose leaves are all at ground level, so herbivory by livestock can reduce seed production but will not kill the plant or remove significant photosynthetic tissue. Grazing can partially remove the overtopping canopy of grasses and sedges, allowing more light to reach Mealy Primrose rosettes.

The two documented occurrences of Taper-tip Desert-parsley in the EBW are on BLM lands in the Ruby Mountains. Competition from invasive, introduced species and noxious weeds, especially spotted knapweed, yellow sweet clover, and cheatgrass, is probably the biggest threat to Taper-tip Desert-parsley. Indiscriminate chemical treatment of invasive species could pose a secondary threat to this plant.

The majority of the public land within the EBW is low probability habitat for the 50 plants currently on the sensitive species list for the Dillon Field Office. A few sensitive plant species such as Buff Fleabane, Idaho Fleabane, Showy Townsendia and Rocky Mountain Dandelion are known to found in nearby locations. Extensive field searches for sensitive plants have not been conducted within the assessment area, so it is quite probable some of these sensitive species may be discovered when botanical surveys are completed in conjunction with proposed projects requiring surface disturbance.

Forest and Woodland Habitat and Associated Species

The close association of much of the forested habitat with adjoining grassland and riparian habitats support a broad array of wildlife species. Forested habitat in the watershed provides important security and thermal cover for deer and elk. Dry Douglas-fir stands have expanded in recent decades, enlarging existing stands and pioneering into adjacent habitat. The resulting habitat conversion to Douglas-fir has reduced forage availability in riparian habitats and shrub-steppe habitat. Several areas of mountain mahogany, aspen, and sagebrush are declining due to competition with increasing conifers. The timber stands provide habitat for a variety of birds and mammals such as hairy woodpecker, blue and ruffed grouse, northern goshawk, red-naped sapsucker, mountain cottontail and snowshoe hare.

Forest Health and Fuels/Fire Management

Forest and woodland habitats comprise approximately 9% of all ownerships, and approximately 49% percent of BLM-administered lands within the EBW. Douglas-fir is the dominant tree species, with interspersed Rocky Mountain juniper, limber pine, and mountain mahogany on rocky slopes and lower elevations. Lodgepole pine and subalpine fir is present at higher elevations, and spruce is found in some mid to high elevation canyon bottoms. Whitebark pine is a minor component found at the highest forested elevations, generally above 8,600 feet on wind-

swept ridges. Patches of Rocky mountain maple have been found on old mud flow areas in the Ruby Mountains.

The majority of forested land administered by the BLM in the EBW is found in the Ruby Mountains. To describe forested habitat, the range is split into the "Northern Rubys" and the "Southern Rubys," with the break occurring at McHessor Creek.

Northern Ruby Mountains

The Northern Rubys consists of very steep and rocky terrain dissected by steep canyons, with nearly continuous forest canopy. Much of the northern Ruby Mountains are designated as a Wilderness Study Area (WSA). The WSA is managed under the Interim Management Policy for Lands Under Wilderness Review, which does not allow timber harvest as a management action. The majority of the BLM administered land within the WSA north of McHessor and Hinch Creeks is classified as Fire Management Category D by the Dillon RMP. This designation means that prescribed fire or naturally ignited fire is desired in this area to benefit resource conditions. The flexibility of fire management in the Northern Rubys is due to few social, economic, or political constraints that exist in the area, and because fire control would be difficult due to poor access and steep terrain.

Evidence of historic fire (e.g. fire scarred trees, breaks in age classes) is extensive throughout the Northern Rubys, and indicates a highly variable mixed severity fire regime. In some portions of the Northern Rubys, frequent, low intensity fires historically maintained a Douglas-fir savannah structure (mature large trees that are openly spaced). As a result of fire exclusion, these historic Douglas-fir savannahs have filled in with high densities of young (<120 years) trees.

Historically, the Northern Rubys experienced severe stand replacing fires. These events led to the current homogenous age class of Douglas-fir trees. Most of the Douglas-fir on the east side of the Ruby Mountains is 100-120 years old, indicating a widespread fire event occurred around the turn of the century. The extremely rugged topography of this area likely contributed to these stand-replacing events, even at elevations and in fuel types that more commonly supported lower intensity fires.

Southern Ruby Mountains

In the Southern Rubys, forest and woodlands are interspersed with sagebrush and grasslands. Effective precipitation and aspect influences the establishment of forests and woodlands. Natural disturbances such as re-occurring fire regulated the extent of forests and woodlands. Conifer expansion into openings, sagebrush/grasslands, and mountain mahogany stands is most evident at the low to mid-elevations. In most of the Southern Rubys, low severity fire historically maintained a Douglas-fir savannah structure, which has now filled in with young (<120 years) trees.

The Spring Creek area (McHessor Creek and Stone Creek Allotments) contains mixed conifer stands with scattered aspen patches. Previous timber management completed in the early 1990's selectively harvested timber on approximately 120 acres.

Forested areas around the Treasure Mine (Stone Creek Allotment) contain mixed conifer stands of primarily Douglas-fir and lodgepole pine. Previous timber management in the early 1990's in Stone Creek selectively harvested timber on approximately 20 acres adjacent to the Treasure Mine.

In the Spring Creek Pasture of the Stone Creek Allotment, a large area of mountain mahogany is being affected by Douglas-fir and juniper expansion. These tree species are competing for limited water, nutrients, and sunlight.

Forest Insects and Disease

Throughout the EBW, western spruce budworm is present and is likely to increase due to suitable stand conditions and climatic patterns. Defoliation caused by spruce budworm is most evident on Douglas-fir, but also affects subalpine fir and spruce species. While spruce budworm does not usually cause direct tree mortality, it will predispose trees to attacks by other insects or diseases. Budworms grow more vigorously in stressed trees, and budworm populations can increase dramatically during drought conditions. Prolonged budworm epidemics cause reduced diameter and height growth (Bulaon and Surdevant, 2006). Western spruce budworm is favored by dry summer conditions and mild winters, and has the greatest impact on trees that are stressed from dense stocking and/or drought conditions (Kamps et al., 2008). The highest amount of spruce budworm defoliation is in the untreated stands in the Spring Creek area.

Douglas-fir bark beetle activity is currently at endemic levels in the Rubys, but has the potential to increase. Douglas-fir most susceptible to bark beetle attack is larger than 14 inches diameter at breast height (DBH), older than 120 years, and growing in dense stands (Weatherby and Their, 1993). Beetles are also attracted to wind-throw and trees weakened by fire, drought, defoliation or root disease (Kegley, 2004). In sub-outbreak populations, Douglas-fir mortality is confined to individual tress or small groups. However during outbreaks, yearly mortality may exceed 100 trees or more in a group and result in a loss of millions of board feet (Kegley, 2004). A few scattered patches of recent Douglas-fir mortality from Douglas-fir beetle were noted in the Northern Rubys.

Throughout the EBW, mountain pine beetle and/or white pine blister rust is affecting and killing many of the limber and whitebark pine. In some areas, conversion from a limber pine timber type to a Douglas-fir type is likely. However, some individual limber pine trees are healthy and may have some degree of resistance to the blister rust. Whitebark pine is declining rapidly across many parts of its range due to the combined effects of the exotic white pine blister rust, the native mountain pine beetle, and the exclusion of fires (Arno 1986; Kendall and Keane 2000; Tomback and others 2000).

Mountain pine beetle is active in the EBW, and is causing mortality of mature lodgepole pine. Most of this activity is in the Southern Rubys, where more lodgepole pine is present. During low mountain pine beetle population levels, attacks are primarily on trees under stress due to injury, drought, overcrowding, etc. However, as beetle populations increase, attacks may involve mostly mature lodgepole pine trees, regardless of their apparent health. Mountain pine beetle has

been noted to attack trees as small as three inches DBH on the Helena and Beaverhead-Deerlodge National Forests (pers. comm. Sturdevant, 2008).

Findings, Analysis and Recommendations

Procedure to determine conformance with Standard

This Standard is an overall assessment of biodiversity and plant and wildlife habitat. The present state of each allotment and habitat type was compared to the natural and historic condition. The indicators described under the definition of Standard #5, as well as condition/function of the other standards, specifically uplands and riparian, were considered to determine whether or not the Biodiversity Standard was met.

The IDT considered the range of natural variation within this ecosystem as well as the species composition, condition of available habitat, and forest health to determine the condition/function of biodiversity. In broad terms, a healthy forest is one that maintains desirable ecosystem functions and processes. Aspects of forest health include biological diversity; soil, air, and water productivity; ability to withstand natural disturbances; and the capacity of the forest to provide a sustaining flow of goods and services for people.

The wildlife habitat niches expected in the EBW are: grasslands (short and mid grasses), bare ground, small streams, riparian/wetlands, sagebrush steppe, conifer forests, aspen stands, and various mixes of these components.

Findings and Analysis

Sagebrush Habitats and Sagebrush Dependent Species

Pygmy rabbit surveys in the Sweetwater area in 2006 verified populations are present in the Sweetwater AMP and Spring Brook Isolated allotments adjacent to the EBW. Old burrows and droppings were found in the Middle Fork allotment within the EBW indicating that suitable habitat is present and at least limited use is occurring. A comprehensive survey would likely show established use in suitable habitat. However, the majority of the EBW assessment area does not contain sufficiently large expanses of sagebrush to support pygmy rabbit or year round sage grouse use. It is likely that the area does serve as limited brood rearing and summer habitat for sage grouse that migrate over from breeding and winter habitat in the Sweetwater area.

In 2006 and 2007 radio telemetry studies were initiated in the Sweetwater area to track habitat use, including nest sites, by sage grouse using leks in the Sweetwater area. As this information becomes available, it will be incorporated into management of public lands. To date, the telemetry data indicates that some summer use occurs as far north as Stone Creek where suitable habitat exists.

Riparian, Aquatic and Wetland Habitat and Associated Species

Recent beaver activity was noted in McHessor and Stone Creeks. Older cuttings were noted on Hoffman Creek, Middle Fork of Stone Creek and Trout Creek. Most of the beaver activity within these drainages was located below public land on private property. Most systems do not have suitable habitat capable of supporting beaver. This is evident by no recent beaver activity or relic dams on BLM administered lands within the drainages.

Livestock use is adversely affecting fish habitat in some streams by altering stream morphology, vegetative composition and cover. Trout Creek showed impacts from livestock grazing and trailing that is likely having an impact to WCT populations. The headwater portion of Spring Creek is likely unable to support year round WCT populations because of low year-round flow, and large pools required for overwinter use.

Within the assessment area, the greatest current threat to native WCT is competition and predation from non-native eastern brook trout. Habitat loss and hybridization from non native rainbow trout are also causal factors contributing to habitat limitations.

There is limited recreational fishing on streams within the EBW due to the small size of the streams.

Table 10: Fisheries Habitat Issues

Stream	Issues Effecting Fisheries Habitat
Trout Creek	Heavy sediment load, bank trampling and heavy grazing pressure on stream bank vegetation. Browsing occurring on woody plants
Spring Creek	Likely does not support year round fish use. Low quality pool habitat associated with headwater environment. Width/depth ratio and raw banks may be impacting WCT habitat downstream
Stone Creek	Excess sediment from Stone Creek Road and runoff from the Treasure Mine (sediment and nitrates)
McHessor Creek	Livestock impacts leading to over-widening of stream channel.
Carter Creek	Habitat in PFC
Hoffman Creek	Habitat in PFC. Limited fisheries habitat.

Generalist or Widespread Species

The watershed lies within portions of Montana hunting districts (HD) 322 for deer and elk, and HD 321 for antelope. Elk populations within the watershed have fluctuated, but are generally on the increase over the past ten years. Antelope populations have shown a decrease in recent years (pers. comm. Brannon, and Fager 2008).

Portions of the assessment area see considerable seasonal wildlife movement. Some fences in the analysis area do not meet BLM wildlife friendly specifications and inhibit wildlife migration.

Forest Health and Fuels/Fire Management

Trees within the Spring Creek harvest units appear to be vigorously growing, and a sample taken within one of the harvest units showed a two-fold increase in radial growth immediately following a timber harvest in the 1990s. Previously harvested stands appear to have less spruce budworm defoliation than in un-harvested stands in the Spring Creek drainage. Currently this area exhibits good structural diversity, with extensive Douglas-fir reproduction in treated areas. Untreated stands have very high densities (basal area of 200-300+ ft2/ac), and are being affected by spruce budworm and mountain pine beetle. The historic Douglas-fir savannah structure has filled in with young trees (<120 years) which act as ladder fuels, and understory vegetation is limited. Aspen skeletons scattered throughout thick Douglas-fir stands are evidence of a loss of upland aspen.

Forested areas that were untreated during the Stone Creek timber sale are currently being affected by spruce budworm and mountain pine beetle. Most mortality of lodgepole pine from mountain pine beetle has occurred in the last few years, and will likely result in mortality of most mature lodgepole pine in the near future due to suitable stand conditions.

Without disturbance, Douglas-fir and juniper regeneration will likely convert the mountain mahogany stand in the Spring Creek Pasture of the Stone Creek Allotment to a conifer dominated stand. Expanding Douglas-fir into sagebrush/grasslands in the Stone Creek Allotment will likely convert areas of sagebrush habitat to a Douglas-fir forest without treatment or a wildfire.

As a result of fire exclusion, conifer densities have increased within forested stands, particularly within Douglas-fir forest types. Forested stands have more continuous cover than occurred historically, and there has been a loss of sagebrush steppe, mountain meadows and aspen due to conifer expansion. The recent drought and increased densities has resulted in forest susceptibility to insect and/or disease infestations and subsequent mortality. The increase in conifer density and mortality from insects and disease has led to a decrease in forest health and an increase in fuel loading throughout forested areas in the EBW.

Historical Fire Regimes

Fire exclusion, caused primarily by fire suppression and the removal of fine fuels by livestock grazing in the area since the 1860's, has changed the structure, density, and plant species composition within the lower grassland and the upland communities. The need for, and subsequent harvesting of forest products to support mining and agricultural activities in the late 1800's and early 1900's also greatly affected forest distribution, species composition and structure.

In the Southern Rubys, high-intensity fires are now more likely to occur in areas that historically experienced more frequent low-intensity fires.

In fire adapted ecosystems, recurrent fire is the dominant disturbance that affects vegetation patterns. One method to describe this disturbance is by using historical fire regimes (Table 11). The fire regime concept is used to characterize the personality of a fire in a given vegetation type, how often it visits the landscape, the type of pattern created, and the ecological effects. The historical fire regimes for the watershed are arranged based on fire severity and fire frequency.

Table 11: Historical Fire Regimes for BLM Administered Lands within the EBW

Historical Fire Regime	Severity (% Overstory Replacement)	Fire Interval (Years)	BLM Acres	% of BLM Forested	Representative Ecosystem
NL – non-lethal	low - <20%	10 to 25	1,605	15%	Dry pine, conifer encroachment and juniper forests
MS1 – mixed Severity, short interval	low - 20-30%	20 to 40	4,149	39%	Lower elevation conifer Forests
MS2 – mixed severity, long interval	mod - 30-80%	40 to 120	1,222	12%	Shrublands, mixed conifer forests
MS3 – mixed severity, variable interval	variable - 10-90%	45 to 275	144	1%	Higher elevation conifer forests
SR1 – stand replacement, short interval	high - >80%	95 to 180	3,444	33%	Certain lodgepole pine, dry Douglas-fir forests
SR2 – stand replacement, long interval	high - >80%	200 to 325	31	<1%	High elevation whitebark pine, spruce-fir
SR3 – stand replacement, non-forest	high - >80%	<35	12,527		Grasslands, many shrub communities

* The acreage calculation for each historical fire regime is based on the hydrologic unit scale. Acreage discrepancies occur through calculations made in GIS.

The majority of forested habitats on BLM-administered lands within the EBW (72%) is in short interval fire regimes and has missed 2 or more fire intervals.

Current Condition Classes

Fire Regime Condition Class (FRCC) is a classification of the amount of departure from the natural fire regime (Hann and Bunnell 2001). Coarse-scale FRCC classes have been defined and mapped by Hardy et al. (2001) and Schmidt et al. (2002), based on a relative measure describing the degree of departure from the historical natural fire regime. This departure is from changes to one (or more) of the following ecological components: vegetation characteristics (e.g., species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g., insect and disease mortality, grazing, and drought).

Three Condition Classes were developed to categorize the current condition with respect to each of the historic Fire Regime Groups. The three classes are based on low (Condition Class 1), moderate (Condition Class 2), and high (Condition Class 3) departure from the natural (historical) regime (Hann and Bunnell 2001, Hardy et al. 2001, Schmidt et al. 2002). Criteria used to determine current condition include the number of missed fire return intervals with respect to the historic fire return interval, and the current structure and composition of the system resulting from alterations to the disturbance regime. Low departure is considered to be within the natural (historical) range of variability, while moderate and high departures are outside. The relative risk of fire-caused losses of key ecosystem components increases as condition class designation increases.

The FRCC classifications for the EBW based on the coarse-scale data are presented in Table 12. The data presented is the most current available and is valuable information to aid managers in estimating actual ground conditions. However, due to the limits of satellite-based imagery the coarse-scale estimates presented in Table 12 may differ from site-specific assessments made by members of the IDT. For example, the coarse-scale assessments obtained through satellite imagery do not take into account finer scale factors influencing condition class such as recent insect and/or disease outbreak, individual stand structure and associated biodiversity issues.

Table 12: Fire Regime Condition Class for BLM Administered Lands within the EBW

Condition Class	Description	BLM Acres*	% of BLM Forested	Example of Typical Management
1	Fire regimes are within a historical range, and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within a historical range. Fires burning in CC1 lands pose little risk to the ecosystem and have positive effects to biodiversity, soil productivity, and hydrologic processes.	5,247	50%	Historical fire regime is replicated through periodic application of prescribed fire or through fire use.

Condition Class	Description	BLM Acres*	% of BLM Forested	Example of Typical Management
2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased) resulting in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range. Wildland fires burning in CC2 lands can have moderately negative impacts to species composition, soil conditions, and hydrologic processes.	13,624 (NOTE: Actual forested cover in this condition class is approx. 1,097 acres. The remainder is sagebrush/ grassland.)	10%	Moderate levels of restoration treatments are required, such as a combination of prescribed fire with mechanical/hand treatment.
3	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals resulting in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range. Wildland fires burning in CC3 lands may eliminate desired ecosystem components, exacerbate the spread of unwanted non-native species, and result in dramatically different ecological effects compared to reference conditions.	4,252	40%	High levels of restoration treatments, such as mechanical treatments, are required before fire can be used to restore desired ecosystem function. Intensive efforts, which may include seeding, herbicide application, biomass removal, and other types of rehabilitation, are required for CC3 lands.
Current conditions are a function of the degree of departure from historical fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, grazing, introduction, and establishment of exotic plant species, insects or disease (introduced or native), or other past management activities (Laverty, Williams 2000).				

*The acreage calculation for each condition class is based on the hydrologic unit scale. Acreage discrepancies occur through calculations made in GIS.

Based on the coarse-scale FRCC analysis, site-specific FRCC assessments, and historic photos of the area, the forested portions of the EBW are moderately departed from natural (historic) conditions.

Recommendations for Biodiversity

1. Revise livestock grazing management in Trout Creek and Middle Fork of Stone Creek to enhance herbaceous cover, reduce trailing, and improve stream bank conditions to improve fisheries habitat.

2. Modify old net-wire fence, dilapidated fence, and fences with improper wire spacing to meet wildlife-friendly specifications in accordance with BLM Manual/Handbook H-1741-1 and ensure that new fences are built to BLM specifications. Remove any unnecessary fences and work with private landowners to improve BLM-private boundary fences to meet BLM specifications.

3. Continue to check and maintain wildlife escape ramps in all stock tanks in the watershed. Wildlife escape ramps were installed during the fall 2008 in all tanks where a need was identified during the assessment.

4. Analyze the use of mechanical treatments and/or prescribed fire to reduce fuel loading, improve forest health, and utilize timber resources in areas affected by insects/disease, particularly in the Spring Creek and Stone Creek areas (McHessor Creek and Stone Creek Allotments).

5. Analyze the use of mechanical treatments and/or prescribed fire to reduce conifers expanding into sagebrush/grasslands and mountain mahogany, particularly in the Stone Creek Allotment.

6. Analyze the use of prescribed fire and/or mechanical treatments to maintain open stand conditions in previously harvested areas in the Spring Creek drainage (McHessor Creek Allotment).

7. Analyze removing conifers within one tree lengths distance from the uphill perimeter of the North Fork Stone Creek exclosure to reduce the incidence of trees falling on the exclosure fence.

Interdisciplinary Team Composition

Core IDT members:

David Early, IDT lead, Rangeland Management Specialist
Kipper Blotkamp, Fuels Specialist
Paul Hutchinson, Fisheries Biologist
Steve Armiger, Hydrologist/Riparian Coordinator
Pat Fosse, Assistant Field Manager for Renewable Resources
Aly Piwowar, Forester

Support IDT members:

Katie Benzel, Wildlife Biologist
Laurie Blinn, GIS Specialist
Jason Strahl, Archeologist
Michael Mooney, Weeds Specialist
Brian Hockett, TES-plants
Bob Gunderson, Geologist/Mining
George Johnson, Fire Management Specialist
Rick Waldrup, Recreation Planer

Other support personnel:

Steve Lubinski, Range Technician
Kelly Urresti, Range Technician
Mary Koerner, Range Technician
Jordan Wells, Range Technician
Shane Trautner, Range Technician
Kate Given, Administrative Assistant
Ellen Daugherty, Administrative Assistant

GLOSSARY

Allotment: an area of land designated and managed for grazing of livestock.

Allotment Management Plan (AMP): a documented program developed as an activity plan, that focuses on, and contains the necessary instructions for, the management of livestock grazing on specified public lands to meet resource conditions, sustained yield, multiple use, economic and other objectives.

Animal unit month (AUM): amount of forage necessary for the sustenance of one cow or its equivalent for a period of 1 month.

Bankfull stage: "The bankfull stage corresponds to the discharge at which channel maintenance is most effective, that is, the discharge at which moving sediment, forming or removing bars, forming or changing bends and meanders, and generally doing the work that results in the average morphologic characteristics of channels." Dunne and Leopold (1978).

Channel stability: the ability of the stream, over time, to transport the flows and sediment of its watershed in such a manner that the dimension, pattern and profile of the river is maintained without either aggrading nor degrading.

Entrenchment: the vertical containment of river and the degree to which it is incised in the valley floor.

Entrenchment ration: a quantitative expression of the ratio of the floodprone width to the bankfull width.

Floodprone width: width measured at an elevation which is determined at twice the bankfull depth.

Forest land: land that is now, or has has the potential of being, at least 10 percent stocked by forest trees (based on crown closures) or 16.7 percent stocked (based on tree stocking).

Functional at risk (FAR): riparian wetland areas that are functional, but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

Hydric soil: soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part.

Hydrophyte: plants growing in water or on a substrate that is at least periodically deficient in oxygen due to excessive wetness. (Tiner 2006)

Lacustrine: from the French "lacustre" or lake. Permanently flooded lakes and reservoirs, generally over 20 acres, exhibiting wave-formed or bedrock shoreline features (Cowardin *et al*., 1979)

Lentic: standing or still water such as lakes and ponds.

Lotic: flowing or actively moving water such as rivers and streams.

Nonpoint source pollution: pollution originating from difuse sources (land surface or atmosphere) having no well defined source.

NPDES: the National Pollutant Discharge Elimination System is a permit program authorized under the Clean Water Act to regulate discharge from point sources to waters of the United States. http://cfpub.epa.gov/npdes/

Palustrine: from the Latin "palus" or marsh. non-tidal wetlands dominated by trees, shrubs, persistent emergent plants, emergent mosses or lichens. (Cowardin *et al.*, 1979)

Proper functioning condition (PFC): Lotic riparian-wetland areas are considered to be in proper functioning condition when adequate vegetation, landform, or large woody debris is present to:

- Dissipate stream energy associated with high waterflow, therEBy reducing erosion and improving water quality;
- Filter sediment, capture bedload, and aid floodplain development;
- Improve flood-water retention and ground-water recharge;
- Develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses;
- Support greater biodiversity

Riparian zone: the banks and adjacent areas of water bodies, water coursed, seeps, and springs whose waters provide soil moisture sufficiently in excess of that otherwise available locally so as to provide a moister habitat than that of contiguous flood plains and uplands.

Rosgen Classification System. The Rosgen system classifies streams at five levels. Level I is a broad level delineation that takes into consideration landform, landscape position, slope, and profile. Streams are classified at this level using aerial photographs and maps. The Level II was developed by Rosgen using reference reaches, i.e. stable stream reaches. Dimensions, patterns and profiles are measured to develop Level II. Field guides have been published to make field determinations at this level. Classifying streams to Level III, IV and V is beyond the scope of this document.

Spring brook: a channel that carries water from a spring. Where there is sufficient flow, the channel forms a perennial stream. Frequently in arid environments, the flow is insufficient to create a perennial stream. Groundwater emerges at the springhead, flows a short distance within the spring brook, and then submerges.

Woodland: forest communities occupied primarily by noncommercial species such as juniper, mountain mahogany, or quaking aspen groves. All western juniper forest lands are classified as

woodlands, since juniper is classified as a noncommercial species. Woodland tree and shrub canopy cover varies, but generally individual plant crowns do not overlap.

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